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Forest-Scale Roads Analysis Report

Manti-La Sal National Forest

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Executive Summary

Introduction

On January 12, 2001, the Forest Service issued the final National Forest System Road Management Rule (36 CFR 212.5). This rule revises regulations concerning the management, use, and maintenance of the National Forest Transportation System. The regulations are intended to help ensure that additions to the National Forest System road network are essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated.

This report documents the information and analysis procedure used for the Manti-La Sal National Forest forest-scale roads analysis. This analysis is designed to provide decision-makers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management action. This forest scale roads analysis focuses on the Forest's primary transportation system. This system is comprised of the objective maintenance level 3 and 4 roads greater than 0.5 mile in length and objective maintenance level 2 collector roads, over which the Forest Service has jurisdiction (see road matrix in Appendix B for road listing and jurisdiction).

Roads analysis is a six-step process. The steps are designed to be sequential with an understanding that the process may require feedback and iteration among steps over time as the analysis matures.

1. Setting up the analysis
2. Describing the situation
3. Identifying the issues
4. Assessing benefits, problems, and risks
5. Describing opportunities and setting priorities
6. Reporting (Key Findings)

The amount of time and effort spent on each step differs based on specific situations and available information. The process provides a set of possible issues and analysis questions; the answers can help managers make choices about road system management. The product of this forest-scale roads analysis is a report for the Forest Supervisor and the public. The report documents the information and analyses used to identify opportunities and set priorities for future national forest road systems. The key products of this roads analysis for subforest scale analyses include the following:

- A watershed risk assessment.
- A map that displays the results of the watershed risk assessment.
- A map that displays the Forest's primary transportation system.
- A road risk versus value matrix that identifies four categories of roads that were evaluated on a road segment by road segment basis.
- A road risk versus value graph based on the road matrix (page 51).
- A map that displays the risk versus value road management categories developed in the analysis (Appendix B).

- A narrative response to questions in Chapter 4.

During subsequent subforest scale roads analysis, the team should first review the watershed risk assessment, including watershed risk assessment maps. This review will help determine how roads may be affecting watershed health in the analysis area and help guide road-related decisions that can address watershed health.

The team should then review, validate, and update the information in the road value versus risk matrix based on local knowledge of the primary transportation system. Changes to the risk and values of these roads may result in changes to the road graph and the potential primary transportation system. The results of road valuations can be used to develop road management alternatives for these roads, including relocation, upgrades, increasing or decreasing the maintenance levels, and possible decommissioning.

During Step 4 of the roads analysis (see page 1), the team should review the forest scale responses to the 71 questions found in Chapter 4. Where the forest scale responses do not adequately address the subforest scale analyses, the team should provide additional information. For example, at the subforest scale the economic questions can better assess road-related costs and benefits. The road risk versus value matrix provides annual and deferred maintenance costs by individual road to help assess road-related costs for economic analyses.

See Chapter 5 for a more detailed explanation of guidelines and use of the roads analysis results.

Key Findings

Forest Scale Issues

Road maintenance funding is not adequate to maintain and sign roads to the objective maintenance level.

- The road matrix (Appendix B) developed for this roads analysis contains the annual and deferred maintenance costs for the primary transportation system on the Forest. Even with the focus on the potential minimum road system, our current budget does not cover total road maintenance needs. The Manti-La Sal National Forest currently receives approximately $900,000 per year for road maintenance, while the counties perform approximately $235,000 worth of annual road maintenance work on roads that are covered by Schedule A Forest Road Agreements. The annual cost of maintaining the primary transportation system to objective maintenance levels would be approximately $1.6 million once all deferred maintenance has been corrected.
- The subforest (project or watershed) level roads analysis process should result in continued reductions of the Forest road maintenance obligations through decommissioning of level 1 and 2 roads. However, these reductions will be minor compared to the overall road maintenance needs on the Forest.

There are potentially adverse environmental impacts from the current classified Forest road system and from user-created roads and trails.

This roads analysis process identified individual roads that represented high potential for environmental risks. Categories 2 and 3 from the Road Risk-Value Graph (page 51) identified approximately 110 miles of these roads.

- Chapter 4 provides more information in response to this issue.

High road densities in some areas of the Forest are causing impacts to resources and users.

- By itself, the maintenance level 3, 4, and 5 road system is not a road density concern.
- Most high road density areas have many unclassified roads and level 1 and 2 roads. At the subforest scale of analysis, these areas would be identified and remedial action recommended. One possible opportunity is the conversion of roads to both motorized and nonmotorized trails.

Right-of-way access across private inholdings is needed.

- In many areas, public access has been successfully acquired through right-of-way acquisition. The jurisdiction column of the road matrix table (Appendix B) displays road segments where the opportunity for additional right-of-way acquisition exists.

The public is concerned about road-related decisions being made without public involvement.

- The public is concerned that decisions about reducing or reconfiguring the Forest's transportation system will be made without the benefit of public involvement. Decisions that will change the existing system will occur through public involvement and a site-specific environmental analysis that considers effects of existing roads or roads proposed for addition, deletion, or reconstruction in the future.

Road access may not be adequate for future management needs.

- Arterial and collector roads are not being maintained to the objective maintenance level specified in the Manti-La Sal National Forest Plan (Forest Plan). This is evident by the operational maintenance level 2 rating of the Ferron-Mayfield Road (FSR50022)
- Subforest scale roads analyses should focus on road-related watershed improvement opportunities, decommissioning of unneeded level 1 and 2 roads, and upgrading roads to meet current and future management and public needs.

Forest Supervisor Guidelines Response

The Forest Supervisor requested the following four items be included in the Roads Analysis Report.

1. An inventory and map of the primary transportation system and a description of how those roads are to be managed.

This report includes three types of maps. The map sets are divided into the geographical divisions used for this analysis.

- The first map set displays the existing primary transportation system with the road numbers. It also includes the remaining inventoried roads without their respective road numbers.
- The second map set displays the Potential Minimum Primary Transportation System. These maps display the Road Management Category for all segments of road included in this analysis. The maps, matrix, and graph show management opportunities for the primary transportation system. In subforest scale analysis, specific road management decisions will be made using this information.
- The third map set displays areas of potential instability. These maps should be used for identifying areas of concern for the subforest scale analysis.

2. Guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.

- Chapter 5 of this report contains guidelines and opportunities for addressing road management issues and priorities related to construction, reconstruction, and decommissioning.
- Chapter 5 identifies opportunities for addressing watershed and aquatic resource concerns.

3. Significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions.

- The environmental issues that surfaced are concerns about the health and condition of some watersheds as a result of road impacts, silvicultural concerns about the current and future health of the forest, and road access for fuel reduction projects and fire suppression, especially in the urban interface areas.

Introduction

Background

In August 1999, the Washington Office of the USDA Forest Service published Miscellaneous Report FS-643, *Roads Analysis: Informing Decisions about Managing the National Forest Transportation System*. The objective of roads analysis is to provide decision-makers with critical information to develop road systems that are safe and responsive to public needs and desires, are affordable and efficiently managed, have minimal negative ecological effects on the land, and are in balance with available funding for needed management actions.

In October 1999, the agency published Interim Directive 7710-99-1 authorizing units to use, as appropriate, the road analysis procedure embodied in FS-643 to assist land managers making major road management decisions.

On March 3, 2000, the Forest Service proposed to revise 36 CFR Part 212 to shift emphasis from transportation development to managing administrative and public access within the capability of the lands. The proposal was to shift the focus of National Forest System road management from development and construction of new roads to maintaining and restoring needed roads and decommissioning unneeded roads within the context of maintaining, managing, and restoring healthy ecosystems.

On January 12, 2001, the Forest Service issued the final National Forest System Road Management Rule. This rule revises regulations concerning the management, use, and maintenance of the National Forest Transportation System. Consistent with changes in public demands and use of National Forest System resources and the need to better manage funds available for road construction, reconstruction, maintenance, and decommissioning, the final rule removes the emphasis on transportation development and adds a requirement for science-based transportation analysis. The final rule is intended to help ensure that additions to the National Forest System road network are deemed essential for resource management and use; that construction, reconstruction, and maintenance of roads minimize adverse environmental impacts; and that unneeded roads are decommissioned and restoration of ecological processes are initiated.

On December 14, 2001, the agency published Interim Directive 7710-2001-3 which removed interim requirements of Section 7712.16. This section addressed road management activities in inventoried roadless and contiguous unroaded areas and reserved to the Chief decision authority over some road construction and reconstruction in roadless and unroaded areas. The directive clarified how and when decisions on roads are made and what actions and activities require roads analysis. Interim directive 7710-2001-2 was removed from 7710 but remains in effect with some change and was simultaneously reissued as an interim directive to Chapter 1920. Interim directive 7710-2001-1 was superseded by 7710-2001-3.

An optimum road system supports land management objectives. For the Forest Service, those objectives have markedly changed in recent years. How roads are managed must be reassessed in light of those changes. Expanding road networks have created many opportunities for new uses and activities in national forests, but they have also dramatically altered the character of the landscape. The Forest Service must find an appropriate balance between the benefits of access to the national forests and the costs of road-associated effects to ecosystem values. Providing road systems that are safe to the public, responsive to public needs, environmentally sound, affordable, and efficient to manage is among the agency's top priorities. Completing an assessment of the road system is a key step to meeting this objective.

Roads analysis is an integrated ecological, social, and economic approach to transportation planning, addressing both existing and future road systems. The analysis is designed to be scaleable, flexible, and driven by road-related issues important to the public and managers. It uses a multi-scale approach to ensure that these issues are examined in context and provides a set of analytical questions to be used in fitting analysis techniques to individual situations. Roads analysis is intended to complement and integrate existing laws, policy, guidance, and practice into the analysis and management of roads on national forests.

The detail of the analyses must be appropriate to the intensity of the issues addressed. Where ecosystem analyses or assessments are completed, roads analysis will use that information rather than duplicating efforts. Roads analysis may be integrated as a component of watershed analysis, landscape assessments, and other analyses supporting existing decision processes.

Roads analysis neither makes decisions nor allocates lands for specific purposes. Line officers, with public participation, make decisions. The roads analysis report informs the decision-maker about effects, consequences, options, and priorities, and provides information about important ecological, social, and economic issues.

Roads analysis may be conducted at multiple scales to inform road management decisions. Generally, road management decisions should be informed by roads analysis at a broad scale. Accordingly, all units of the National Forest System should conduct a forest-scale roads analysis (FSM 7710, Section 7712.13).

Roads analysis at the forest-scale will generally provide the context for informing road management decisions and activities at the watershed, area, and project level. However, it is generally expected that road inventories and road condition assessments such as 1) identification of needed and unneeded roads; 2) identification of road associated environmental and public safety risks; 3) identification of site-specific priorities and opportunities for road improvements and decommissioning; 4) identification of areas of special sensitivity, unique resource values, or both; and 5) any other specific information that may be needed to support project-level decisions would be completed at the watershed or project scale (subforest scale), not the forest scale.

Process

Roads analysis is a six-step process. The steps are designed to be sequential; the process may require feedback and iteration among steps over time as the analysis matures. The amount of time and effort spent on each step differs by project based on specific situations and available information. The process provides a set of possible issues and analysis questions; the answers can help managers make choices about road system management. Decision-makers and analysts determine the relevance of each question, incorporating public participation as deemed necessary. The following six steps guided the process.

Step 1: Setting up the analysis

Step 2: Describing the situation

Step 3: Identifying the issues

Step 4: Assessing benefits, problems, and risks

Step 5: Describing opportunities and setting priorities

Step 6: Reporting (Key Findings)

Products

The product of this analysis is a report for the Forest Supervisor and the public. The report documents the information and analyses used to identify opportunities and set priorities for the Manti-La San National Forest road system. A map displaying the known road system for the analysis area and the risks and opportunities for each road or road segment is included in this report.

The Forest Leadership Team specifically asked the project team to provide the following information in this analysis report:

- An inventory and map of the primary transportation system. This system is predominately objective maintenance level (ObML) 3 and 4 roads (those maintained for low clearance vehicle use) and ObML 2 collector roads. A description of how those roads are to be managed is to be included.
- Guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.
- Significant social and environmental issues, concerns, and opportunities to be addressed in project-level decisions.

This Report

This report documents the information and analysis procedure used for the Manti-La Sal National Forest Forest-Scale Roads Analysis. The report contains a table rating each road for recreation values, resource values, annual and deferred road maintenance costs, watershed risks, wildlife risks, wet travel risks, and engineering concerns. It contains management guidelines and opportunities for future actions that will affect the Forest roads system. It includes a map of the Forest and the four geographic divisions analyzed. It also includes geographic division maps with the existing primary transportation system and geographic division maps with the road value versus risk categories for the primary transportation system.

Chapter 1 Setting up the Analysis

Objectives of the Analysis

Establish the Level and Type of Decision-Making the Analysis will Inform

This roads analysis report will be used to support the Manti-La Sal National Forest Plan revision; subsequent watershed, area, or project scale roads analyses; and other future site-specific road related NEPA analysis and decision-making. It is intended to identify prioritized opportunities that address watershed health or road maintenance.

Identify Scale/Analysis Area

The analysis will:

- Be at the Forest scale for the Manti-La Sal National Forest (1.3 million acres) in southern Utah, Region 4 of the National Forest System.
- Concentrate on the Forest's primary transportation system. This system is predominately objective maintenance level (ObML) 3 and 4 roads (those maintained for low clearance vehicle use). ObML 2 collectors were also included in the analysis. Some of the short (less than 0.5 mile in length), local maintenance level 3 roads that serve a single function, such as campground spurs, fishing access roads, and parking lot access were not included in this analysis and will be included at the watershed and project scales.
- Analyze to some extent four geographic divisions: Wasatch Plateau, San Pitch Mountains, La Sal Mountains, and Abajo Mountains.
- Be spatial or Geographic Information System (GIS) based whenever possible.
- Use only existing information.
- Use information and data consistent with that being used for the Manti-La Sal National Forest Plan revision.

Interdisciplinary Team Members

The Core Interdisciplinary Team and their specialties:

Jeff Alexander	Team Leader, Transportation Planning
Linda Crawley	Writer-Editor
Allyson Ford	Engineering
Katherine Foster	Watershed
Joe Gallagher	Recreation
Pete Kilbourne	GIS and Database Analysis
Ann King	Social/Economic
Rod Player	Terrestrial, Aquatic, Threatened, and Endangered Species

Analysis Plan

The main analysis process considered 674 miles of road with Forest Service jurisdiction: 194 miles of ObML 2 collector roads; 463 miles of ObML 3 roads; and 17 miles of ObML 4 roads. There are no maintenance level 5 roads in the Forest roads database that have Forest Service jurisdiction. The process was a two-step, integrated approach that considered issues, data, and information and systematically addressed all roads in a single analysis.

Step 1 considered the following:

- Issues
- Road location (miles of road)
- Annual and deferred maintenance costs
- Recreation use values
- Resource management values
- Watershed risk
- Wildlife risk
- Wet travel conditions
- Engineering concerns

The interdisciplinary team (IDT) factored all of the items listed and assigned a low, medium, or high value rating to recreation use and resource management. The IDT also assigned a low, medium, or high risk rating for watershed risk, wildlife risk, and road maintenance costs to each road in the system. A poor, fair, or good rating was assigned to the wet travel condition. Engineering concerns were assigned a value of low, moderate, or high.

In Step 2, the IDT grouped the two value ratings into a single low, medium, or high rating. The three risk ratings, the wet travel factor, and the engineering concern factor were grouped into a single low, medium, or high rating. This resulted in each road segment having a set of descriptive coordinates that indicated their value and risk (e.g., high value, low risk). The descriptive coordinates for each road were plotted on a graph with four quadrants representing the following categories:

- Category 1 – High Value, Low Risk
- Category 2 – High Value, High Risk
- Category 3 – Low Value, High Risk
- Category 4 – Low Value, Low Risk

The results of this exercise are listed in the Road Management Category column on the road matrix table (Appendix B). Only those roads under Forest Service jurisdiction, or those short portions of county, state, or private roads where the Forest Service is the primary maintainer, were assigned categories. High and low values and high and low risks were easy to plot into their associated quadrants. Medium values and medium risks were collected along an x-axis or y-axis and defaulted into the adjacent quadrant so that effectively no medium categories were possible in the final allocation (see Road Risk-Value Graph, page 51, for final results).

Once the roads were assigned one of the four categories, recommendations for future actions could be limited to those categories. This simplified the final product and made it possible to map the possible future road system in total and by geographic division.

IDT members conducted resource-specific analyses to derive the data that appears in the road matrix (such as watershed risk and recreation use value) and the information to answer the questions in Chapter 4 – Assessing Benefits, Problems, and Risks.

Information Needs

The IDT identified the following information sources for use in the analysis:

- Manti-La Sal National Forest 1991 Travel Management Decision Memo and project file
- 1986 social and economic assessment for Manti-La Sal Forest Plan
- Deferred and annual maintenance costs in INFRA
- INFRA travel routes
- Potential Public Forest Service Road (PFSR) project submittals
- Suitable Timber Base for the 1986 Manti-La Sal Forest Plan
- Roadless area inventory for the Manti-La Sal Forest Plan (1984)

The IDT also identified the following GIS base map needs:

- Roads (all)
- Trails
- 5th-level watersheds
- Streams and riparian areas
- Geological hazards
- Landtype associations and soil map units
- Management Area prescriptions from 1986 Forest Plan
- 1986 recreation opportunity spectrum inventory
- Developed recreation sites
- Land status
- Occurrence of threatened and endangered species

Communications

The IDT was concerned about the possibility of public confusion on what this forest scale roads analysis process was and was not. Because the process would not involve an action proposal resulting in a decision, it would be difficult to collect public input at the forest scale.

The communication effort was low-key, informative, aimed at stakeholders with a direct and meaningful interest in National Forest road system management. This was appropriate for three main reasons. First, this is not a NEPA analysis requiring a legally mandated level of public scoping and involvement (that will come later, when road-specific decisions are made). Second, this effort was to be completed in a few months, necessitating an adequate, but not overdone, public involvement effort. Finally, numerous public scoping efforts related to road and travel management have preceded this analysis. An adequate base of knowledge about public issues already exists and will be used to identify opportunities.

The IDT felt that county commissioners, who have the actual road management knowledge and information that could be useful in identifying mutual (county and Forest Service) opportunities and issues, were the key contacts for public involvement.

Public Contacts

During 2001 through May of 2002, Sanpete, Ferron, Price, Moab, and Monticello Ranger District employees contacted county commissioners from their local counties. Some of these were formal contacts with the District Ranger making presentations at monthly commissioner meetings. Some were more informal with the District Ranger, District staff, and/or Forest Engineering Staff making contacts with individual commissioners. Forest Service representatives explained the Roads Analysis Process; provided copies of the January 12, 2001, Federal Roads Policy and Rule; and discussed mutual road-related issues and potential opportunities. In addition, the commissioners were asked to review the already identified issues, clarify them if necessary, and offer any new issues.

Contact was made with the Emery County Public Land Council, Emery County Road Department, and communities of Emery, Ferron, Castle Dale, and Huntington. Informal discussions were also initiated with a local OHV/ATV user group and most livestock operators. The presentation generally included the need for the analysis based on the current condition of level 3, 4, and 5 roads. The difference between the forest and watershed scale analysis was discussed.

In Sanpete County, numerous contacts were made with grazing permittees, woolgrowers, snowmobilers, and local Utah Division of Wildlife representatives to discuss roads and access to the Forest.

In Grand and San Juan counties, meetings and open houses were held with county commissioners; the San Juan County Roads Committee; cities of Moab, Monticello, and Blanding; Bureau of Land Management; San Juan, Grand, and Montrose County (Colorado) Road Departments, environmental groups, and individuals.

Generally, there was agreement that existing level 3, 4, and 5 roads are the main transportation system and are important for public access and management of the forest. None of the existing level 3, 4, and 5 roads are expected to be closed. Generally, there was support of seasonal closure of key roads to reduce damage in the early spring. By far the greatest interest was directed toward the watershed scale analysis especially with level 1 and 2 roads and unclassified roads. There is a strong public desire to have many of these roads converted to ATV trails. Interest was expressed to maintain some OHV trails.

Figure 1. Map of Geographic Divisions/Units on the Manti-La Sal National Forest

Chapter 2 Describing the Situation

The Analysis Area

The area addressed in this roads analysis is not a contiguous land unit. The Manti-La Sal National Forest (about 1.3 million acres) is located in southeast Utah. The Forest is divided into four geographically distinct areas or divisions: Wasatch Plateau, San Pitch Mountains, La Sal Mountains, and the Abajo Mountains (see map on preceding page). The climate varies from semi-arid in the lower elevations to cool and humid in the high elevations. Well-known attractions include scenic byways and scenic backways, distinctive rock formations, and numerous cliff dwellings. Federal, state, and county road systems connect the areas.

Wasatch Plateau

The Wasatch Plateau unit or Manti division encompasses about 750,000 acres of National Forest System lands (NFS) and is characterized as a well-roaded, north-south trending high-elevation plateau (8,000 to10,000 feet). It includes the Ferron and Price Ranger Districts, east of Skyline Drive, and a portion of the Sanpete Ranger District, west of Skyline Drive. The Wasatch Plateau is used by residents of local communities such as Price, Huntington, Castle Dale, and Ferron to the east; Mount Pleasant, Ephraim, and Manti to the west; and by visitors from Provo, Spanish Fork, and other cities along the Wasatch Front.

Recreationists use the road system in summer, fall, and spring for sight seeing, dispersed camping, fishing, and hunting. Most roads are closed by snow during the winter. A prominent transportation feature is State Road 31 (Huntington Canyon) that transects the middle portion of the unit and transports large numbers of recreationists, coal miners, and power plant workers. Skyline Drive (FSR 50150), open only during the summer, is a popular high-clearance vehicle scenic-backway road that runs the entire length of the plateau. North of Highway 31, Skyline Drive accommodates passenger cars. Huntington Canyon (SR 31) and Eccles Canyon (SR 264) are National Scenic Byways and are open to travel year-round.

San Pitch Mountains

The San Pitch Mountains division in Juab and Sanpete Counties is within the Uinta National Forest and consists of approximately 76,000 acres of NFS lands administered by the Sanpete Ranger District. Management responsibility was turned over to the Manti-La Sal National Forest because the Red Cliffs that border the unit on the northwest from Nephi towards Levan create an effective physical barrier for access from the west. Roads that access this unit are Log Hollow/Middle Mountain Road (FSR 50069) near Fountain Green and the Chicken Creek road (FSR 50101), which connect the towns of Levan and Wales. Most of the roads are native surface and open only during the summer months. Recreationists use the area mostly for dispersed camping, ATV use, and access during hunting season. Because major highways bypass this area, general use by visitors from the Wasatch Front is low when compared to other parts of the Forest. The one exception is Maple Canyon Campground, which is popular with rock climbers year-round.

La Sal Mountains

The La Sal Mountain Range of Utah (including Carpenter and Sinbad Ridges to the east in Colorado) encompasses approximately 170,000 acres. The La Sals are steep mountains with limited access. The primary access on the west flank is the La Sal Loop Road (FH46--a mostly paved road under jurisdiction of Grand and San Juan County, Utah). Motorized access for vehicles to Warner Lake, Oowah Lake, and Pack Creek developed recreation areas is provided on aggregate surface, intermittently maintained roads. The Geyser Pass and La Sal Pass roads cross the mountain range with some segments only passable by high clearance vehicles. The Buckeye Reservoir area (Colorado) is accessed from

Paradox, Colorado, and Two-mile Road from the town of La Sal, Utah. Recreationists from the Wasatch Front and the nearby town of Moab use the road and trail system during the spring, summer, and fall for ATV use, mountain biking, backcountry snowmobiling, cross-country skiing, and dispersed camping. The La Sal Mountain Loop Road (FH46) from Spanish Valley to Castle Valley is a Utah Scenic Backway.

Abajo Mountains

The Abajos are steep mountains with limited access. Primary access is from Blue Mountain and Harts Draw Road (FH49) (a paved road under jurisdiction of San Juan County) starting in Monticello and ending at the intersection of State Road 211 leading into the Needles District of Canyonlands National Park. The developed recreation sites at Dalton Springs and Buckboard are directly adjacent to the Blue Mountain Highway. Motorized trails for ATVs and motorcycles are provided at several locations along the Blue Mountain and Abajo Peak (FSR 50087) roads. The North Creek drainage (on the west side of the Abajos) runs to the Johnson Creek area just north of Blanding and provides additional high clearance access from Monticello to Blanding. The Bulldog and Devils Canyon areas adjacent to State Road 191 provide numerous motorized trails for ATV and motorcycle use as well as easy access to the Devils Canyon developed recreation site.

The Elk Ridge unit is formed by steep sandstone canyons and mesa tops. Access to the Elk Ridge area is provided on native surface, intermittently maintained roads off State Road 95 to the south (adjacent to the Natural Bridges National Monument) running north through the Forest. This route provides trailhead access to the Dark Canyon Wilderness area, eventually making its way to the North Cottonwood drainage adjacent to State Road 211. Numerous motorized (ATV and motorcycle) and non-motorized (hiking, biking, and equestrian) trails can be found adjacent to the Elk Ridge Road. Recreationists use the road and trail system in summer, fall, and spring for sight seeing, hiking, ATV use, dispersed camping, fishing, hunting, and access to the Dark Canyon Wilderness area. Most roads are snowed in during the winter.

The National Forest Transportation System

General Description

The transportation system on the Manti-La Sal National Forest serves a variety of resource management and access needs. Most roads on the Forest were originally constructed for commercial purposes including grazing, timber, and mineral extraction. Others resulted from construction of water storage and transmission projects for municipal water supplies. Over the past 100 years, an extensive road network has been developed and continues to serve commercial, recreation, and administrative purposes while providing access to private lands.

There are currently 2,785 miles of classified[1] forest roads on the Manti-La Sal National Forest Transportation System. The Forest has jurisdiction for 2,264 miles while approximately 521 miles have county, state, or private jurisdiction. The five Ranger Districts, Sanpete, Ferron, Price, Moab, and Monticello, share management of the road system. There are public roads with state and county jurisdiction within each of the Ranger Districts.

NFS roads are maintained to varying standards depending on the level of use and management objectives. Roads may currently be maintained at one level with plans for maintenance at a different level at some future date. The operational maintenance level is the maintenance level currently assigned to a road considering today's needs, road condition, budget constraints, and environmental concerns. In other words, it defines the level to which the road is currently being maintained. The objective maintenance level is the maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns. The objective maintenance level may be the same as, or higher than, the operational maintenance level. The transition from operational maintenance level to objective maintenance level typically depends on reconstruction. There are five maintenance levels used by the Forest Service to determine the work needed to preserve the investment in the road. These maintenance levels as described in *Forest Service Handbook (FSH) 7709.58 – Transportation System Maintenance Handbook* are as follows:

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[1] Classified roads are wholly or partially within or adjacent to NFS lands that are determined to be needed for long-term motor vehicle use, including state roads, privately owned roads, NFS roads, and other roads authorized by the Forest Service.

Level 1: Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and to perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level.

Roads receiving level 1 maintenance may be of any type, class, or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for nonmotorized uses.

Level 2: Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses

Level 3: Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed material.

Level 4: Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated.

Level 5: Assigned to roads that provide a high degree of user comfort and convenience. These roads are normally double lane, paved facilities. Some may be aggregate surfaced and dust abated.

The Manti-La Sal National Forest does not currently have any maintenance level 5 roads. Approximately 9% (211 miles) of NFS roads are managed (operational maintenance level) and maintained for public use with low-clearance vehicles (passenger cars). These roads carry more traffic and are the most costly to maintain. The Manti-La Sal National Forest desires (objective maintenance level) that nearly 20% (460 miles) of the NFS roads be maintained for public use with passenger vehicles.

The following table summarizes the miles of level 3 and 4 roads under Forest Service jurisdiction.

Table 1. Objective Maintenance Level 3 and 4 Roads (USFS Jurisdiction) by Geographic Unit (miles).

Maintenance Level	Abajo Mountains	La Sal Mountains	Wasatch Plateau	San Pitch Mountains	Forest Total
3	98.0	54.8	293.7	3.0	449.5
4	0.1	3.7	6.2	0.0	10.0
Total	98.1	58.5	299.9	3.0	459.5
	21%	13%	65%	1%	100%

The remaining 1,804 miles of inventoried NFS roads either have restrictions on motorized vehicle traffic use (maintenance level 1) or are managed for high-clearance vehicles such as pickup trucks and four-wheel drive vehicles (maintenance level 2). These roads are single-purpose, low volume roads normally single-lane and unsurfaced.

Many routes on NFS land are not recognized as part of the transportation system. These unclassified[2] routes on the Manti-La Sal National Forest have been identified by a variety of methods, including Global Positioning System (GPS) alignments collected during field inventories, alignments digitized from 1997 Digital Orthoquad photos, and alignments identified by Forest employees. There are approximately 1,372 miles of these unclassified routes, of which 324 miles were verified with GPS; 1,048 miles were identified from aerial photos and need to be ground-truthed as either user-developed or closed routes. The majority of these routes have been created by off-road vehicle traffic. Some of these routes were once classified system roads that the Forest attempted to decommission; use is still occurring on routes where such efforts were unsuccessful. Management decisions on whether or not to include theses routes as part of the transportation system or to decommission or restrict them from further use will be made at the watershed or project scale.

The focus of this forest scale roads analysis is the Forest's primary transportation system. This system is predominately the 20% of roads that are objective maintenance level 3 and 4. Short (less than 0.5 mile), local, maintenance level 3 and 4 roads that primarily serve a single function, such as campground spurs, fishing access, or parking areas, were eliminated from this study and will be analyzed at the watershed and/or project scale. Roads not included in the 20% that still function as an integral part of the Forest's transportation system include maintenance level 2 collectors, which are included in this analysis.

Meeting Forest Plan Objectives

Arterials and collectors are the roads used to provide primary access to large portions of NFS lands. Arterials normally serve as connections between towns, major county roads, or state highways and are main thoroughfares through the Forest. Collectors link large areas of the Forest to arterials or other main highways.

The Manti-La Sal Forest Plan set the following goal or desired future condition for the Forest's transportation system:

> The transportation system would be safe, functional, economical, and environmentally acceptable. Road construction, reconstruction, surfacing, operation, and maintenance for coal, gas, oil, and uranium exploration, development, and production would be coordinated with other resource activities.
>
> The basic arterial and collector, as well as the local system serving major rural recreation sites, would be reconstructed, reconditioned, and/or surfaced, and then maintained to carry passenger traffic at level 3 or higher maintenance for the intended season of use. All other arterials would be maintained to a minimum requirement of maintenance level 3. All other open collectors will be maintained to a minimum maintenance level 2.

According to the current inventory, a portion of the Forest transportation system is not meeting this direction. Maintenance levels of Forest arterial and collector roads are shown in the following table.

Table 2. Operational Maintenance Levels of National Forest System Roads (UFSF Jurisdiction): Arterial and Collector (miles)

Maintenance Level	Arterial	Collector
1	0	0
2	24	377
3	16	120
4	0	4
5	0	0
Total Miles	**40**	**501**

[2] Unclassified roads are roads on NFS lands that are not managed as part of the Forest transportation system (unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail, and those roads that were once under permit or other authorization and were not decommissioned upon termination of the authorization).

Table 3. Objective Maintenance Levels of National Forest System Roads: Arterial and Collector (miles)

Maintenance Level	Arterial	Collector
1	0	0
2	0	183
3	40	314
4	0	4
5	0	0
Total Miles	**40**	**501**

According to the current inventory, 24 miles of arterial road are not being maintained to the level directed by the 1986 Forest Plan. All 24 miles occur on the Ferron-Mayfield Road (FSR 50022) between mileposts 17.3 and 41.3.

Federally Designated Forest Highways, Scenic Byways and Scenic Backways

The analysis area contains seven Forest Highways designated under the Public Lands Highways program of the Transportation Equity Act for the 21st Century (TEA21). These routes are state or county owned roads qualifying for federal funding for improvement or enhancement. They provide access to and within the national forest. These roads are listed in the following table.

Table 4. Federally Designated Forest Highways.

Forest Highway Route No./Name	Description	County	Length (miles)
FH 7 Fairview-Huntington	State Route 31, begins in Fairview and ends in Huntington	Sanpete Emery	48.0
FH 8 Ephraim-Orangeville	State Route 29, begins in Ephraim and ends in Orangeville	Sanpete Emery	46.6
FH 45 Eccles Highway	State Route 264, begins on FH 7 and ends on Highway 96	Sanpete Emery Carbon	15.6
FH 46 La Sal Loop	Previously FSR50062, begins on FSR50073 and ends on FSR50207	San Juan Grand	37.0
FH 47 Elk Ridge Loop Road	From junction with UT 275 near Natural Bridges National Monument, northerly via FSR50088 to junction with UT 211 at Dugout Ranch	San Juan	58.7
FH 48 South Elks Road	From junction with UT 95, 11 miles west of Blanding, north and west via FSR50092 to junction with Elk Ridge Road	San Juan	17.1
FH 49 Monticello-Newspaper Rock Road	Begins in Monticello, west and north via FSR50105 and FSR50100 and ends at the junction of HWY 211	San Juan	16.6

Forest Highway funding can be used for planning, design, and construction or reconstruction of these designated routes. Other work can include parking areas, interpretive signing, acquisitions of scenic easements or sites, sanitary and water facilities, and pedestrian and bicycle paths.

Scenic Byways are paved roads that are generally safe, open year-round, and used by passenger car or motor coach. Utah's 26 State Scenic Byways were designated in 1991. There are only 57 National Scenic Byways designated nationwide with funding available through TEA21. Huntington Canyon (SR 31) and Eccles Canyon (SR 264) were designated State Scenic Byways in 1991, National Forest Scenic Byways in 1990, and combined as the "Energy Loop" and designated as a National Scenic Byway by the Federal Highway Administration in 2000.

Roads are designated as Scenic Backways rather than byways for one primary reason; they generally do not meet full secondary highway standards. They are not wide enough, graded well enough, or level enough to accommodate passenger cars year-round and often require a four-wheel drive vehicle. They do meet the highest standard of scenic, recreational, and historic criteria. Forest roads that have been designated as State Scenic Backways include: Chicken Creek Road (San Pitch Mountains), Skyline Drive and Ferron-Mayfield Road (Wasatch Plateau), La Sal Mountain Loop Road (La Sal Mountains), and Elk Ridge and Abajo Loop Roads (Abajo Mountains/Elk Ridge).

Budget

The Forest budget allocation for planning, construction, and maintenance of roads averaged $900,000 per year from 1997 to 2001. The annual cost to maintain the entire road system to assigned maintenance level is considerably higher than the amount allocated by Congress. In prior years, congressionally appropriated road funding was supplemented by road construction and maintenance work performed by timber purchasers through the commercial timber sale program. This program has declined steadily over the last decade.

The Forest receives maintenance assistance from the counties through Schedule A Forest Road Agreements. Carbon, Emery, Grand, and San Juan counties (Utah) and Montrose County (Colorado) perform annual maintenance activities on approximately 263 miles of road with Forest Service jurisdiction. This equates to an estimated $235,000 worth of annual road maintenance work. Even with this additional assistance, the budget for road maintenance is not adequate.

From 1999 through 2001, the Forest has conducted road condition surveys to determine the annual cost of maintaining the road system to assigned objective maintenance level. Road maintenance needs were also recorded to determine the cost of road maintenance deferred in previous years due to lack of funding. Finally, road improvement work necessary to bring the roads up to the desired objective was identified and documented. As part the roads analysis, this data was used to determine Forest Service budget needs for the primary transportation system. The numbers found in the table below demonstrate the need for additional funding.

Table 5. Summary of Needed Funds for Road Maintenance and Operations for Primary Transportation System.

Total Miles	Annual Maintenance		Deferred Maintenance		Capital Improvements	
	$/mile	Total $	$/mile	Total $	$/mile	Total $
674	$2,420	$1,630,835	$7,235	$4,876,384	$13,557	$9,137,283

Chapter 3 Identifying Issues

Identifying Issues

Issues were generated from public response to the Manti-La Sal National Forest Travel Management Decision Memo (1991), local knowledge of the roads analysis IDT members, public response to a variety of project proposals, and discussion with other public agencies. The Forest Supervisor reviewed and accepted the following issues. The issues were sorted into two categories, forest scale and subforest scale. The forest scale issues will be addressed through this roads analysis document. Subforest scale issues could include roads analysis at the area, watershed, or project scale; watershed or landscape assessments; or site-specific project proposals.

Forest-Scale Issues

1) Road maintenance funding is not adequate to maintain and sign roads to the objective maintenance level.
    - About 210 of the 428 miles of objective maintenance level 3 and 4 roads over which the Manti-La Sal National Forest has jurisdiction, meet the objective maintenance level.
    - Congressionally appropriated road maintenance funding is not adequate to maintain the existing transportation system to the prescribed maintenance levels and traffic service levels.
    - Directional, warning, and road number signing needs to meet legal requirements. Some NFS roads do not meet all requirements of the Highway Safety Act.
2) Road improvement funding is not adequate to meet assigned traffic service levels. Some road realignments, widening, and surfacing are needed to accommodate anticipated increases in vehicle volumes and additional vehicle types.
3) There are potentially adverse environmental impacts from the current Forest road system and from unauthorized, user-created roads and trails. Roads causing adverse impacts should be evaluated for disposition at a subforest level scale.
    - Scientific studies and documentation in the past decade have revealed a number of adverse environmental impacts caused by roads.
4) Right-of-way access across private inholdings is needed.
    - Many NFS roads that provide access to scattered parcels of NFS lands cross privately owned lands. The Forest Service does not have legal rights-of-way on many of these roads.
5) Some roads may not be under the appropriate jurisdiction.
    - Some roads have been under Forest Service jurisdiction for many years. Due to changing use, it might be more appropriate for them to be under county jurisdiction or special use permits.

Subforest Scale Issues

1) There are potentially adverse environmental impacts from the current Forest road system and from unauthorized, user-created roads and trails. Roads causing adverse impacts should be evaluated for disposition at a subforest level.
2) Unclassified roads need to be identified and a management strategy for each road defined. Options include adding the road to the system, decommissioning, or converting to another use such as a trail.

3) The public expressed concern that reducing or reconfiguring the Forest's transportation system might happen without the benefit of public involvement. Public involvement shall be an integral part of the decision process for subforest scale analyses.

4) The forest scale analysis identifies areas that may need right-of-ways established across private land. These areas are identified in the road matrix table (Appendix B) where the jurisdiction field contains a (P) and should be validated at the subforest scale.

Chapter 4 Assessing Benefits, Problems, and Risks

Introduction

For the purpose of this roads analysis, the June 11, 2001, version of the R-2 Roads Analysis Supplement to FS-643 was used as the guideline for this step. This guideline document provides direction and suggestions about the best scale at which each question could be answered. The IDT used the overall guidance provided but decided it would attempt to answer most of the questions at the forest scale to provide at least background information for each question for referencing and citing purposes during subforest scale roads analyses.

Current Road System Benefits, Problems, and Risks

Aquatic, Riparian Zone, and Water Quality (AQ)

The forest scale analysis provides the basic framework for watershed or project level analysis. Subforest scale analyses will identify site-specific areas being affected by the road system and opportunities to address these concerns.

Many of the 5th level watersheds used in this analysis extend beyond the Forest boundary. This analysis is confined to the Forest portions of these watersheds.

AQ1: How and where does the road system modify the surface and subsurface hydrology of the area?

Roads expand the channel network, convert subsurface flow to surface flow, and reduce infiltration on the road surface. All of these factors affect the overall hydrology in a watershed, particularly the quantity and timing of flow.

The channel network is expanded by road ditches, which create *de facto* stream channels in previously unchannelized portions of the hillside. Segments of ditch discharging into a natural channel effectively become another tributary to the stream network. An expanded channel network augments peak flows since water traveling as concentrated surface flow reaches the channel faster than water traveling as subsurface flow (Wemple et al. 1996). Road ditches also intercept subsurface flow and convert it to surface flow. Reduced infiltration contributes to additional surface flow since water does not infiltrate for storage in the soil profile, but rather runs off as overland or surface flow. Storage and movement of water through the soil profile as subsurface flow regulates and sustains stream baseflows. When roads disrupt these processes, more water becomes available during peak flows, and less water is available during low flow periods.

There are relatively few level 3, 4, and 5 roads in each watershed. However, many of these roads have been in place for many years and reflect legacy construction practices that affect hydrology. These practices include road drainage design and culvert sizing.

Historically, road drainage systems were designed with the sole objective of protecting the structural integrity and utility of the road; effects on the environment were of little concern (Gardner 1979). Large volumes of water were often allowed to collect from long lengths of road and then channeled directly into streams, a practice that contributes to delivery of large volumes of sediment.

While protection of road integrity remains important, environmentally effective road drainage has developed as an equally important objective during the past 30 to 40 years. Now roads are often fit more closely to the topography, with rolling grades providing natural drainage, rather than the long uniform road grades used in the past. Roads are purposefully designed to discharge water frequently, to minimize length of direct delivery, to discharge at locations chosen to minimize delivery of water and sediment to streams, and to minimize concentration of water that could contribute to slope gullying or landslides.

Drainage of existing road systems can be redesigned to substantially reduce sediment delivery, often to a fraction of the original amount, by increasing the frequency of relief drains or other techniques. Another major improvement in road design and drainage involves the size of culverts placed in streams at road crossings. For decades, most western states required that culverts be designed to pass only the 25-year flood – a design that is statistically predicted to have a 50% probability of overtopping within 17 years of installation (NCASI 2001). For culverts with an end area less than 35 square feet, the Forest Service now uses the 50-year event for culvert design. For culverts with an end area greater than 35 square feet, the 100-year event is used for culvert design.

San Pitch Mountains, Wasatch Plateau, Abajo Mountains/Elk Ridge, and La Sal Mountains

Road/stream network interactions are similar in all the divisions. At the watershed scale, an analysis of effects must include all classified and unclassified roads. A thorough assessment of the hydrologic connectivity of roads can only be done at the individual stream and road segment scale (7th level HUCs or smaller). Therefore, additional analysis will be deferred to subwatershed or project analyses.

AQ2: How and where does the road system generate surface erosion?

Surface erosion is highly dependent on soils, road surfacing, road grade, road age, traffic volumes, and the effectiveness and spacing of drainage structures. The greatest surface erosion problems occur in highly erodible terrain. This would include areas with soils derived from Mancos shales, the North Horn formation, and sandy soils with few fines or rocks. Erosion hazard was one of several factors used in the watershed risk analysis.

AQ3: How and where does the road system affect mass wasting?

Roads are affected by and can cause mass wasting. Road-caused mass wasting results from:

- Improper placement and construction of road fills and stream crossings.
- Inadequate culvert sizes to accommodate the peak flows, sediment loads, and woody debris.
- Roads located on soils prone to mass wasting.
- Water concentration on unstable hillslopes.

Wasatch Plateau

There are several areas of known slope instability. In 1983, old landsides were reactivated and new ones initiated along much of the west slope of the Wasatch. Several roads were damaged enough to require relocation and reconstruction. This includes the level 3, 4, and 5 roads in the Twelvemile, Manti, Lake Creek, and Chicken Creek watersheds.

In addition to the entire west side of the Wasatch Plateau, the North Horn formation is unstable

San Pitch, La Sal, and Abajo/Elk Ridge Mountains

Mass wasting is not a widespread concern on these units, but it does occur in localized areas.

AQ4: How and where do road-stream crossings influence local stream channels and water quality?

Road-stream crossings have the potential to directly and indirectly affect local stream channels and water quality. Poorly designed crossings directly affect hydrologic function when they constrict the channel, when they are misaligned relative to the natural stream channel, or when improperly sized culverts are installed. Road-stream crossings also deliver water and sediment directly to the stream channel.

AQ5: How and where does the road system create potential for pollutants, such as chemical spills, oils, deicing salts, or herbicides, to enter surface waters?

Anywhere roads run adjacent to or cross streams or floodplains, there is some potential for spilled pollutants to access streams. Generally, hazardous materials and other pollutants are not transported in bulk across the Manti-La Sal National Forest. County weed programs do use herbicides on the Forest and will create some potential for pollutant contribution in the case of vehicle or equipment accidents. Log haulers and other heavy equipment associated with harvest and road activities carry sufficient fuel and oil to cause localized water quality problems should an accident occur. This is minimized by stipulations in timber sale contracts that specify haul speeds, fueling practices, weather or road moisture limitations, and other aspects of operations. Similar risks and preventive measures are associated with mining activities and road maintenance.

The application of magnesium or calcium chloride for road dust abatement may affect water quality, but past studies have found that the effects can only be detected after many years of repeated year-round application (Heffner 1997). Typically, magnesium or calcium chloride is only applied one to two times per year on roads requiring it, generally, maintenance level 4 and higher roads and roads used for commercial hauling. This factor should be considered when upgrading the maintenance level to 4 or higher in areas where aquatic threatened, endangered, and sensitive species are present.

Magnesium and calcium chloride may be used during the winter months as deicing agents. The application rates are often higher than for dust abatement. The chemicals do not bind with the soils or pavement, and the frequency of applications is generally higher. For these reasons, the use of these salts for deicing purposes has a higher potential for affecting water quality. One study found that wells contaminated with chloride were on average 24 feet away from the treated highway. In a worst-case scenario, a stream with a flow of 20 cubic feet per second had a chloride concentration of 275 parts per million (ppm) in a 24-hour period. This concentration was slightly above the drinking water standard and below the tolerance limits for trout (Heffner 1997). A recent study on I-70, near the Eisenhower Tunnel in Colorado, found that the use of magnesium chloride for deicing is not likely to cause adverse effects to water quality or aquatic organisms at distances greater than 20 yards from the highway (CDOT 1999). A similar study along I-70 on the west side of Vail pass found a substantial increase in chloride concentrations below the highway where deicing salts were used compared to control streams, but the concentrations were still within state water quality standards (Lorch 1998). While no specific information has been gathered to compare the application rates and frequency of deicer on highways that run through the Manti-La Sal National Forest as compared to I-70, it is a reasonable assumption that both frequency and application rates are higher on I-70, and the results from the I-70 study should be applicable to the Forest.

Highways where deicing salts are used would have the highest risk of affecting water quality, but these effects are generally localized, do not exceed water quality standards, and become diluted as the salts move downstream through the system. State Roads 31 and 264 are the highest risk roads as they both parallel and cross perennial streams (SR 31 – Huntington Creek, Cottonwood Creek/Fairview Canyon; SR 264 – Eccles and Mud Creek, Gooseberry Creek).

AQ6: How and where is the road system "hydrologically connected" to the stream system? How do the connections affect water quality and quantity?

The road system is hydrologically connected to the stream system where there are road-stream crossings, where ditches discharge into the stream network, as well as areas where roads are adjacent to stream courses and there is an insufficient buffer strip between the road or road drainage structures and the stream system. This question is better answered in detail at the individual stream or project level.

AQ7: What downstream beneficial uses of water exist in the area? What changes in uses and demand are expected over time? How are they affected or put at risk by road-derived pollutants?

Downstream beneficial uses of water include agriculture, drinking water, recreation, and cold and warm water fisheries. The beneficial uses in Utah and Colorado are similar; however, the terminology is different.

<u>San Pitch Mountains, Wasatch Plateau, Abajo Mountains/Elk Ridge, and La Sal Mountains</u>

Several of the designated uses for on-forest waterbodies can be affected by road-derived pollution. Reservoir storage is reduced by accumulated sediment. Fish are detrimentally affected if sediment from forest roads surpasses the tolerance of the fish and prey (aquatic invertebrate) populations or if roads cause channel instability that degrades aquatic habitat (see AQ 1-4, AQ 6). The High Quality 1 anti-degradation standard can be violated if water quality is lowered through lack of best management practices during road design, building, or maintenance; it can also be violated if these conservation practices are implemented but not effective.

Other downstream beneficial uses include domestic drinking water. Question WP2 addresses the effect of roads on municipal watersheds.

AQ8: How and where does the road system affect wetlands?

Roads can affect wetlands directly by encroachment, and indirectly by altering hydrologic surface and subsurface flow paths. Encroachment results in a loss of wetland area directly proportional to the area disturbed by the road. Alteration of the hydrologic flow paths can affect wetland function with the effects extending beyond the area directly affected by the road.

AQ9: How does the road system alter physical channel dynamics, including isolation of floodplains, constraints on channel migration, and the movement of large wood, fine organic matter, and sediment?

Roads can directly affect physical channel dynamics when they encroach on floodplains or restrict channel migration. Floodplains help dissipate excess energy during high flows and recharge soil moisture and groundwater. Floodplain function is compromised when roads encroach on or isolate floodplains. This can increase peak flows. When peak flows increase, more water is available for in-channel erosion, which, in turn, affects channel stability. Restricting channel migration can cause channel straightening which increases the stream energy available for channel erosion. This can also result in channel instability. Altering channel pattern affects a stream's ability to transport materials, including wood and sediment.

AQ10: How and where does the road system restrict the migration and movement of aquatic organisms? What aquatic species are affected and to what degree?

Migration and movement of aquatic organisms are primarily restricted at road-stream crossings with culverts. Generally, the restriction is on upstream migration, although downstream migration can also be affected. This results from hanging culverts, high flow velocities in culverts, and inadequate depths for fish migration. In some locations, migration barriers are desirable to protect native species. While culverts can affect the migration of amphibian species, the greatest concern is the effect on fish species.

Non-native trout are the most widely distributed fish species on the Manti-La Sal National Forest. The non-native species include brook trout, rainbow, and brown trout. The primary native species of concern are the Bonneville and Colorado River native cutthroat trout. Stream crossings on level 3, 4, and 5 roads have not been evaluated.

AQ11: How does the road system affect shading, litterfall, and riparian plant communities?

The road system directly affects riparian communities where it impinges on riparian areas. Roads can indirectly affect riparian communities by intercepting surface and subsurface flows and routing these flows so riparian areas dry up, and the riparian vegetation is replaced with upland vegetation. Riparian communities play a vital role in providing shade. Removal or degradation of these communities can affect stream stability and water temperatures, which in turn affects aquatic habitat.

AQ12: How and where does the road system contribute to fishing, poaching, or direct habitat loss for at-risk aquatic species?

High traffic roads adjacent to streams with fish are the most likely to contribute to fishing and poaching. Generally, this is not considered an issue on the Manti-La Sal National Forest and does not significantly affect aquatic populations and at-risk aquatic species.

The road system contributes to direct habitat loss where mass movements associated with roads directly impact stream channels (AQ3), where sediment is delivered directly to the stream channel through connected disturbed areas (AQ6), at road-stream crossings (see AQ4), and where the road system is restricting channel migration and isolating floodplains (see AQ9). Watersheds with Colorado River cutthroat trout populations are of particular concern. This concern is included in the watershed risk ratings. Opportunities to address problem areas would be similar to those previously identified.

AQ13: How and where does the road system facilitate the introduction of non-native aquatic species?

The introduction of non-native species occurs primarily through stocking of non-native fish. The Utah Division of Wildlife Resources coordinates stocking locations with the Forest Service to ensure that non-native aquatic species are not being introduced into waters containing native fish species or waters that provide high quality habitat for native species reintroduction.

The Utah Division of Wildlife Resources is converting several reservoirs and lakes currently stocked with non-native fish to Colorado River cutthroat trout. Lakes close to roads may be easier for others to inadvertently or intentionally "restock" these lakes with non-natives.

AQ14: To what extent does the road system overlap with areas of exceptionally high aquatic diversity or productivity or areas containing rare or unique aquatic species or species of interest?

The level 3, 4, and 5 road system crosses several watersheds identified in the conservation strategies for Bonneville and Colorado River cutthroat trout. This was incorporated into the watershed risk rating.

No areas of exceptionally high aquatic diversity or productivity have been identified.

Terrestrial Wildlife (TW)

TW1: What are the direct and indirect effects of the road system on terrestrial species habitat?

Roads have both direct and indirect effects on wildlife. Wildlife habitat is impacted by the construction and use of roads. The area contained within the roadway reduces the total area of habitat. Additionally, wildlife is impacted by the use of roads. For individuals such impacts can mean death or injury from collisions with vehicles. Another, more frequent, impact is avoidance of the area adjacent to roadways. The area avoided depends upon the species of concern as well as individual characteristics. Additional impacts are increased harassment and disturbance resulting from increased human presence.

During the winter, especially mule deer and elk become familiar with vehicles along highways. As long as the vehicles do not stop, these species appear to be unaffected by the roadway or traffic. On the other hand, people camping, picnicking, fishing, or hiking (in the majority of instances) displaces big game. The indirect effect of the road system appears to be one of movement and displacement.

Improperly designed and constructed stream crossings can adversely affect wetland habitats and species such as waterfowl and associated amphibians. Some such impacts are the result of sedimentation and lowered water tables.

The construction and use of roads has contributed to the expansion of populations of noxious weeds throughout much of the Forest especially on the Wasatch Plateau and San Pitch divisions. Weed seeds are transported on vehicles in mud and by other means. It is common to find small populations of noxious weeds along roads. The rapid expansion of noxious weeds is having an adverse impact on wildlife habitat as desirable forage and cover species are replaced with noxious weeds.

Improved and expanded road systems bring about additional human activities. These activities can bring about additional man caused fires, which have both adverse and beneficial effects on terrestrial species habitat.

Wasatch Plateau

A prominent transportation feature of the Wasatch Plateau portion of the Manti-La Sal National Forest is State Road 31 which is a paved road connecting Huntington on the east to Fairview on the west. During the late fall and winter, wintering mule deer and elk congregate in the lower reaches on the eastern end of this highway resulting in many collisions between vehicles and big game. On a single day in 2000, there were 14 deer and 3 elk killed. While not as noticeable as big-game species, many other species of birds and mammals are killed by vehicles.

Another prominent transportation feature of the Wasatch Plateau is Skyline Drive, which traverses the top of the plateau from north to south. This travel way provides access to many roads along most of the side ridges. While wildlife species are less likely to be killed by vehicles along these routes, deaths do occur.

Elk populations in the area are at or above Utah Division of Wildlife Resources herd objectives. Due to unknown factors, mule deer populations are presently well below herd objectives. The above-mentioned roads provide hunters vehicular access to within a few miles of the entire Plateau making it difficult to maintain sufficient numbers of mature bulls and bucks for the respective herds. This is especially true for elk. The Utah Division of Wildlife Resources has instituted a limited entry hunt for mature bulls on the elk herd found on the Plateau.

San Pitch Mountains

Elk and mule deer are present in hunted population levels on this unit. Small mammals and forest grouse are also hunted. The predominant habitat types are sagebrush and mountain brush. Roads on this unit are characterized as rough, and road locations are difficult. Vehicle speed is lower, and there are fewer vehicle-wildlife collisions.

La Sal Mountains

The La Sal Loop, a paved road, provides the main access to the La Sal Mountains from the west. Vehicular use of this road has increased greatly in the last 15 years as the popularity of recreation in the Moab area has grown. The majority of human activities occur along this road or the arterial roads that connect to it. With improved access comes increased use and greater impacts, both direct and indirect, on wildlife habitat.

Abajo Mountains/Elk Ridge

Elk, mule deer, black bear, and mountain lion are present in hunted population levels on this unit. Small mammals and forest grouse are also hunted. The Harts Draw Road leading from Newspaper Rock to Monticello has recently been widened and paved. Increased traffic and vehicle speed has resulted in numerous collisions with mule deer along the roadway, especially near Monticello.

Summary

As road access improves and use levels increase, more and more habitat is impacted either directly or indirectly. However, in all four divisions of the Manti-La Sal National Forest, the existing maintenance level 3, 4, and 5 roads, in concert with associated paved interstate or state highways, are not exerting any substantial negative or positive direct or indirect effects on terrestrial wildlife habitat.

TW2: How does the road system facilitate human activities that affect habitat?

Wasatch Plateau

The Wasatch Plateau is a major destination for recreationists from the population centers along the Wasatch Front. Outdoor recreation is the predominant human activity on the Wasatch Plateau division. Pleasure driving to enjoy the Forest is probably the highest recreation use category. Snow pack closes the road system to motorized vehicles during the winter months. Developed campgrounds are located at certain points in the network. Dispersed camping and trailheads serve picnickers, mountain bikers, rock climbers, wildflower enthusiasts, hunters, and equestrians. Recreational activities, with the exception of hunting, cause minor temporary displacement of wildlife. The avoidance areas reduce the usefulness of the habitat for the displaced species and create more wildlife use in other areas.

The Wasatch Plateau road system provides access to private inholdings. There are many inholdings because past mining laws allowed the conversion of NFS lands to private ownership where mineralization could be proven. Except near high use areas, these inholdings do not seem to greatly affect habitat use.

Because of fuel wood gathering, there are fewer snags or dead trees close by the most accessible roads on the plateau. This has slightly reduced the number of potential nesting trees for primary and secondary cavity nesters, as well as foraging habitat for woodpeckers.

San Pitch Mountains

Human activities on the San Pitch Mountains are similar to those on the Wasatch Plateau except to a lesser degree.

The main human use of the San Pitch Mountains is hunting for mule deer and elk. Driving for pleasure and hunting are activities made possible by the road system. These activities do not appear to be affecting habitat in this area.

La Sal Mountains

Because of fuel wood gathering, there are fewer snags or dead trees close by the most accessible roads on the mountain. This has reduced the number of potential nesting trees for primary and secondary cavity nesters, as well as foraging habitat for woodpeckers.

Each year the road system on the La Sal Mountains brings more recreationists to the area. Visitors are attracted to the location for its scenic value and for climatic relief. This directly affects habitat security.

The road system makes wildlife habitat management activities (such as prescribed burns, aspen regeneration, and seeding of clearcuts to enhance grass and forage species) easier and more efficient.

Abajo Mountains/Elk Ridge

The Abajo Mountains/Elk Ridge division road system allows a variety of multiple use activities that affect habitat. Grazing, timber harvest, mining, and recreation are activities that potentially affect habitat or use of habitat (habitat effectiveness). Early uses of the division land, such as mining and grazing, have declined. A rudimentary transportation network provided access for these activities. Modern day uses, such as timber harvest by mechanized means and summer recreation access by low-clearance vehicles, have increased the number of all-weather, higher-maintenance level 4 and 5 roads.

Summary

In all four divisions of the Manti-La Sal National Forest, the existing road system (maintenance levels 3, 4, and 5) is facilitating human activities that affect habitat. The activities range from human-influenced successional change to displacement from habitat.

TW3: How does the road system affect legal and illegal human activities? What are the effects on wildlife species?

The Forest road system supports a high volume of legal human outdoor recreational activities, which have a moderate affect on wildlife populations. Visitors from the Wasatch Front as well as locals use the Forest at an increasing rate. For example, the road system allows ATV users to easily disperse throughout the area. Such activities temporarily displace big game animals. Due to growing dispersed recreational use of all types, higher densities of human use, and a concern for human safety, ATV use is being encouraged in some locations and discouraged in others. Increased, unregulated ATV use has an adverse effect on many wildlife species as they are displaced from their preferred habitat and forced into more crowded, less desirable habitat.

Hunting is permitted on all areas of the Forest. Annually hunters legally harvest upland game, mule deer, and elk. The most sought-after (limited) license is for elk. Illegal human activities such as poaching occur throughout the Forest with several cases being reported and prosecuted each year.

The roads in certain areas are closed during late spring and early summer to provide security for big game during parturition (birthing) and the first few weeks of life and to protect the road surface. Illegal entry beyond these gates does affect wildlife and their use of available habitat.

Proximity to communities has brought a certain amount of illegal dumping—old appliances, carpets, etc. The effect on wildlife is negligible.

Summary

The road system makes it possible to conduct legal as well as illegal activities. The legal hunter and the poacher use the same system. The firewood cutter with a legal permit uses the same roads as the person who illegally cuts firewood without a permit.

In all four divisions of the Manti-La Sal National Forest, the existing road system (maintenance levels 3, 4, and 5) affects the public's legal and illegal activities. Road density is directly related to wildlife security.

TW4: How does the road system directly affect unique communities or special features in the area?

The communities that are unique to terrestrial wildlife on the Forest are the vast escarpments (cliff faces), talus slopes, small bogs, wetlands, and old growth timber in small isolated closed types. Such areas provide nesting habitat for many raptor species including Golden Eagles, Peregrine Falcons, and Mexican Spotted Owls. These areas are largely unaffected by roads because of the difficulty of constructing roads in such areas. The road system does make these areas more accessible to humans and human-caused impacts.

Summary

The unique communities or special features in the four divisions of the Forest are directly affected by the road system, which provides easier access to members of the scientific community or wildlife enthusiasts. The road system and the access it provides do not appear to be degrading special features. The road system can be managed to regulate potential impacts to wildlife values and important habitat.

Ecosystem Functions and Processes (EF)

EF1: What ecological attributes, particularly those unique to the region, would be affected by roading of currently unroaded areas?

There are three types of special management designations that would potentially be affected by roading: Research Natural Areas (RNAs), Wilderness, and Semi-primitive Recreation (SPR). Currently, there are 6 RNAs, 13 SPRs, and a wilderness area on the Manti-La Sal National Forest. These areas are managed for their unique recreational opportunities and scientific values. In addition, there are numerous inventoried roadless areas on each division of the Forest. Roading could reduce the value of these areas for scientific studies and primitive recreational experiences.

EF2: To what degree do the presence, type, and location of roads increase the introduction and spread of exotic plant and animal species, insects, diseases, and parasites? What are the potential effects of such introductions to plant and animal species and ecosystem function in the area?

The construction and use of roads has contributed to the expansion of exotic or noxious weed populations throughout much of the Forest especially on the Wasatch Plateau and San Pitch divisions. Weed seeds are transported on vehicles in mud and by other means. It is common to find small populations of noxious weeds along roads. The rapid expansion of exotic and noxious weeds is adversely affecting wildlife habitat and range forage resources as desirable forage and cover species are replaced with exotic and noxious weeds.

Roads may directly influence the spread of exotic organisms by vehicles transporting organisms or indirectly through habitat alteration and creation of early seral, bare soil, or patchy ground cover that favors weedy species. The undesirable species may be unpalatable to native wildlife, may crowd out native plant species, or may have other undesirable effects on native species and ecosystems.

In 1995, the Forest Service issued a closure order requiring use of only certified, weed-free hay to prevent livestock permittees, hunters, and others using horses and other equestrians from bringing in hay containing noxious weed materials. The road system plays a role in the spread of noxious weeds to dispersed areas. The certified weed-free hay program is showing success. Control efforts, in cooperation with the counties, are concentrated along the road and trail system.

Wasatch Plateau

There are large infestations of exotic and noxious weeds, primarily musk thistle, on the Wasatch Plateau. These infestations are the greatest on the west side and north end of the Plateau. It is not unusual to find new populations of noxious weeds along the roadways in these areas.

San Pitch Mountains/La Sal Mountains/Abajo Mountains/Elk Ridge

There are large infestations of exotic and noxious weeds, primarily musk thistle, on these divisions. It is common to find new populations of exotic and noxious weeds along the roadways in these areas.

Summary

The presence, type, and location of road systems in the divisions have increased the introduction and spread of exotic plant species. All four divisions of the Manti-La Sal National Forest have certain levels (from localized to widespread) of undesirable exotic (noxious weeds) plants. The levels of noxious weeds are of high concern, and without ongoing management and control, noxious weed populations may become unmanageable.

EF3: How does the road system affect ecological disturbance regimes in the area?

Understanding disturbance ecology is a key part of ecosystem management. To have an effective ecosystem management policy, resource managers and the public must understand nature, ecological resiliency and stability, and the role of natural disturbance on sustainability. Efforts to suppress disturbance agents have reduced biodiversity and compromised ecosystem health. It is not a question of whether disturbance will happen but when, where, and what kind. The types of disturbances that are likely within specific ecosystems, the criteria for predicting where particular disturbances may happen, and the probability of occurrence must be incorporated into forest and project plans. This information and the management objectives for those areas can help resource managers better determine appropriate alternatives (Averill, 1994).

The most common disturbance agents affecting the Manti-La Sal National Forest ecosystems are disease, drought, fire, and insects. It is not possible to discuss one disturbance agent without recognizing the association with other disturbance agents. For example, insect outbreaks frequently are associated with drought, and drought creates a greater potential for fire. Increased tree mortality increases the amount of ignitable fuel, the chance of fire, and when it occurs, fire intensity. Root disease can predispose trees to attack by insects and makes trees more prone to windthrow.

Fire is thought to be the most significant natural disturbance agent in mid and high elevation forests. It has shaped the vegetation mosaic for thousands of years by causing stand-replacing disturbances on a variety of scales.

Between May and August of 2002, the Manti-La Sal National Forest experienced a series of large fire events. Approximately seven fires ranging from 100 acres to 6,000 acres occurred on the Forest. The combination of drought, low live/dead fuel moistures, higher than average temperatures, and lower than average humidity plus winds were the major factors contributing to large fire growth.

Currently the Forest is completing a review of past fire history. When this review is completed, an overall picture of fire occurrences and large fire events over 100 acres will be available.

As road access is created on the Forest, some increase in the number of human-caused fires is expected. This does not seriously affect the wildfire situation on the Forest. The kind of resources dispatched will meet access needs and could vary from aviation delivered to walk in or engine units.

Summary

The idea that an unroaded ecosystem will remain in a static, constant condition simply because roads are not built in the area is not correct. Ecosystems in which the major disturbance regimes (such as fire) have been significantly altered are unduly stressed and vulnerable to upset by the slightest change. It is essential to understand and incorporate disturbance process, whether natural or human-induced, in resource management. The consequences of trying to suppress a natural disturbance agent (such as lighting-caused fires) must be considered and possibly counteracted by inducing human caused disturbance events or management of natural ignitions. Roads do not directly affect ecological disturbance regimes, but they are necessary for management access when human-induced disturbance events are part of active resource management.

EF4: To what degree does the presence, type, and location of roads contribute to the control of insects, diseases, and parasites?

In general, road access facilitates the control of forest insects, disease, and parasites. Whether the type of control is direct (such as burning or de-barking of infested materials) or indirect (altering stand conditions to reduce insect and disease impacts), road access certainly facilitates these control efforts by allowing crews and equipment to easily access and treat sites.

One goal of the Forest Plan is to "Monitor effects of insect and disease and treat vegetation to reduce the risk of epidemic outbreaks" (page III-5, Manti-La Sal Forest Plan EIS, 1986). The Forest Plan general direction includes, "Prevent or suppress epidemic insect and disease populations that threaten forest tree stands with an integrated pest management (IPM) approach consistent with resource management objectives" (page III-84, Manti-La Sal Forest Plan EIS, 1986).

The idea of integrated pest management is to manage resources in a manner that limits or reduces the development or perpetuation of pest problems. Silvicultural treatment of affected or susceptible tree stands can prevent and suppress insects and disease occurrences. As trees grow old, they decrease in growth rate and vigor and become less resistant to insect or disease attack. Severe conditions such as drought and overstocking can reduce tree growth rate, which also reduces resistance to insects or disease. An important characteristic indication of a healthy forest is the diversity and distribution of tree stand ages and species composition. The greater the diversity and distribution of stand ages and species, the more resistant the entire Forest is to damage from any single insect or disease.

Summary

Most bark beetle detection, prevention, and suppression activities require road access. Without road access, insect and disease management on suitable timberland and other tentatively suitable timberland where management may be needed to meet desired conditions is not feasible.

EF5: What are the adverse effects of noise caused by developing, using, and maintaining roads?

This is not an issue at the forest scale. It will be addressed if it is an issue at the subforest scale.

Economics (EC)

EC1: How does the road system affect the agency's direct costs and revenues? What, if any, changes in the road system will increase net revenue to the agency by reducing cost, increasing revenue, or both?

At the forest scale, this question can be answered in broad terms, as a detailed cost/benefit economic assessment is not feasible. The IDT for the Manti-La Sal National Forest road analysis process addressed this question by developing the Road Value versus Risk matrix to determine what roads fell into which road management category. The IDT identified four road management categories for this forest scale roads analysis.

Some opportunities may exist to increase road maintenance funding through Recreation Fee DEMO for the developed campgrounds, and to ensure that special-use permit holders pay their fair share of road maintenance where appropriate. The most obvious approach to reduce road maintenance costs while increasing revenue would be to more intensely manage the suitable timber base and mineral resources that currently have road access. Purchasers and leasers would be required to perform road maintenance on the roads they use, and the Forest would collect funds to help keep these access roads maintained to standard.

EC2: How does the road system affect the priced and non-priced consequences included in economic efficiency analysis used to assess net benefits to society?

This is a project-scale question, not a forest scale question.

EC3: How does the road system affect the distribution of benefits and costs among affected people?

This is a watershed-scale question, not a forest scale question.

Commodity Production (TM, MM, RM, SP, SU)

Timber Management (TM)

TM1: How does the road spacing and location affect logging system feasibility?

This question is most applicable at the subforest scale during project analysis. It is an important consideration, however, for determining timber suitability, management area allocations, and economic efficiency during a forest plan revision.

Past sales on the Manti-La Sal National Forest were logged using ground-based equipment with some helicopter logging. Trees are either felled by hand with chain saws or cut mechanically with a feller buncher and then yarded to the landing with rubber tired grapple skidders. In general, road spacing of 2,000-3,000 feet would be economical for ground-based skidding. In the past four years, several sales that included helicopter-logging units have been sold. These sales included optional units that were beyond the average helicopter flight distances. These units did not have to be logged unless the purchaser chose to accept the option; all of these units were logged.

The cut-to-length logging system has been used in several areas within Region 4. This system uses a mechanical processor that cuts, limbs, and bucks the logs to length at the stump. The logs are then brought to the landing on a forwarder. It is possible to yard logs longer distances with a forwarder and thus the road spacing can be a little wider. A timber sale, which includes units planned for logging with a forwarder, is currently being considered on the La Sal Division. However, due to the high purchase price (for the equipment) and relatively low amount of suitable timber acres available for this type of equipment on the Forest, the cut-to-length system is not considered more economical than conventional rubber tired systems. If cut-to-length systems are required in timber sales to increase road spacing, stumpage values will be reduced, and there will be a greater chance of no-bid timber sales. Another reason the cut-to-length system has not been utilized on this Forest is that it is a short log system (less than 25 feet). Most of the log trucks and sawmills in this area are designed and equipped to haul and handle long logs.

In general, close road spacing results in quick turn around times and higher production that reduces yarding cost and increases stumpage value. Although closer road spacing can increase the total road cost due to more roads, the cost can be reduced with the use of temporary roads or offset by reduced yarding costs.

Cable logging systems are not common within this area of Region 4 and have seldom been used (only on private land) on the Manti-La Sal National Forest. The road location is particularly important for cable logging. Most cable logging systems employ uphill yarding and roads located above the unit and along the “break” (where the slope changes from gentle to steep) provide better cable deflection that usually increases production and reduces ground disturbance. Long cable yarding distances (greater than 1,600 feet) require larger size equipment and wider roads. Cable logging is currently proposed for use in a timber sale on the La Sal Division. The amount of steep slope cable yarding opportunities will be analyzed during the suitable timberland analysis for the forest plan revision.

Most of the Forest is high elevation. Because of the elevation, a helicopter's lift capacity is greatly reduced, making helicopter logging more expensive on this Forest. Helicopter logging feasibility is improved by locating roads and landing to provide downhill yarding and short yarding distances (the average preferred distance is less than 0.5 mile). A number of recent and planned timber sales are using and will use more intensive helicopter harvest in combination with ground-based harvest. Proposed timber sales that include helicopter logging have generated interest from industry.

Generally, road construction is only utilized or authorized where it is determined to be economically and technically necessary to achieve resource management objectives. The most efficient road spacing that would maximize timber stumpage values is not acceptable because it usually conflicts with other resource management objectives.

TM 2-3: How does the road system affect managing the suitable timber base and other lands? How does the road system affect access to timber stands needing silvicultural treatment?

Lands suitable for timber management in the Forest Plan were determined by:

1) Identifying all forested land from nonforested land.
2) Subtracting forested land not available including: wilderness areas, research natural areas, wild and scenic river corridors, powerline corridors, and administrative sites such as campgrounds.
3) Subtracting forested land with non-industrial wood such as pinyon-juniper, limber pine, Gambel oak, and cottonwood.
4) Subtracting forested land where irreversible damage is likely to occur if managed for timber production.
5) Subtracting forested land where restocking cannot be assured within five years.
6) Subtracting forested land where adequate response information is not available. These are areas where there was not enough information to predict response to timber management. These areas cannot be considered part of the suitable land base until further inventory is collected.

The result of the above steps was land identified as tentatively suitable for timber management. The Forest Plan identified 368,100 acres out of the 1,334,491 total Manti-La Sal National Forest acres as tentatively suitable.

7) The last step in the suitability analysis was to determine the suitable land from the tentatively suitable land base. This step excluded the lands identified as not appropriate for timber production because they were assigned to other resource uses to meet forest plan objectives.

When the Forest Plan Record of Decision was signed in 1986, 132,700 acres were identified as land suitable for timber management. The Allowable Sale Quantity (ASQ) was calculated from growth and yield projections based on these areas only. This did not include any acres with greater than 40% slope. At that time, the Forest did not believe the value of the timber would support the use of helicopters or road construction to support cable logging.

Project-level IDTs have concluded that some stands in the suitable base are incompatible with management area prescriptions (they are too rocky, too wet, have unstable soils, etc.), and those acres have been removed from the suitable land. Another larger scale effort identified forested riparian areas as not suitable for timber management and those acres were removed from the suitable land base. As the Manti-La Sal National Forest prepares for forest plan revision, the suitable timberland will be reanalyzed and what was learned from project level analysis during the past 15 years will be used in the Forest Plan Revision Suitability Analysis.

Timber management on the suitable timberland and on other tentatively suitable timberland where timber management may be needed to meet desired future condition is economically feasible only if road access is present. Without an adequate road system, management objectives cannot be accomplished.

A detailed transportation system analysis for the unroaded portion of the Forest Plan suitable land was not undertaken because the suitable timberland will probably change as part of the analysis for the forest plan revision. A more detailed transportation system plan will be done during subforest and watershed scale analyses.

The management decision on whether to provide access to unroaded portions of the suitable land will be made in the forest plan revision. On June 7, 2001, Forest Service Chief, Dale Bosworth, directed Regional Foresters to "ensure that forest plan amendments and revisions consider, as appropriate, the long-term protection and management of unroaded portions of inventoried roadless areas." This direction is apparently much the same as the direction in the planning regulations. 36 CFR 219.17 states:

> "Unless otherwise provided by law, roadless areas within the National Forest System shall be evaluated and considered for recommendation as potential wilderness areas during the forest planning process…"

The forest plan revision process will inventory, evaluate, and make recommendations on how to manage roadless areas. A full range of management alternatives will be considered. Some alternatives might provide access to unroaded areas for timber management and other active resource management while other alternatives might recommend part of the roadless areas be placed in permanent wilderness designation. Until the Forest Plan is revised, the Chief will be the deciding officer on decisions to construct roads in inventoried roadless areas.

Minerals Management (MM)

MM1: How does the road system affect access to locatable, leasable, and salable minerals?

Minerals are addressed in the Manti-La Sal Forest Plan (pages II 51-53, III 34-36, III 80-82). Existing classified roads are used for primary access to mineral operations (locatable, leasable, and saleable) and are generally sufficient for that purpose. In some cases, existing forest system roads must be improved to higher standards to accommodate the proposed increased volume and type of vehicles and provide for continued safe use by other existing forest traffic.

Construction of new temporary and/or classified mineral-related roads is usually closed to public use. Unless otherwise authorized, roads that are no longer needed for mineral operations are reshaped to as near a natural contour as practicable and stabilized. Bonding is required, as appropriate, to assure road maintenance and reclamation are completed.

Range Management (RM)

RM1: How does the road system affect access to range allotments?

Roads have allowed, and even encouraged, increased recreation that often has an adverse impact on livestock grazing. The resulting dispersed recreation denudes vegetation and prohibits use in some areas as recreationists displace livestock. As roads are improved and vehicles speeds increase, the likelihood of livestock-vehicle accidents increases.

In many areas, roads have replaced driveways as a means for transporting sheep and cattle to and from mountain allotments. As a result, the vegetative condition and overall health of these driveways have improved dramatically. Until the 1970s, livestock driveways were considered "sacrifice areas" in the range-management discipline (Stoddart and Smith 1955).

The road network on the Manti-La Sal National Forest has increased the administration capability of the range management program. The road network allows range management specialists to access allotments quickly by using vehicles rather than horses. Grazing permittees have likely experienced lower operating costs because of motorized access to allotments.

National Forest road systems are essential for administering the grazing program. Compliance enforcement particularly benefits from forest roads. Roads also allow timely access to allotments. Allotment management plans sometimes utilize roads in the design of their grazing system or as driveways to and from the allotment.

<u>Summary</u>

Manti-La Sal National Forest maintenance level 3, 4, and 5 roads are an important part of grazing management. Roads are an important component of the compliance and administration of the Forest's grazing program. Roads have an ecological effect on the Forest's range program because of their role in the spread and management of noxious weeds (see EF2).

Water Production (WP)

WP1: How does the road system affect access, constructing, maintaining, monitoring, and operating water diversions, impoundments, and distribution canals or pipes?

The existing road system provides sufficient access to many existing water diversions, impoundments, and distribution canals and pipes. The larger impoundments and diversions tend to be accessed by the arterial and collector roads. However, the Forest does have some agricultural ditch and reservoir access that are restricted to the public and accessed by the permittees on a "by request" basis for inspection and maintenance only, as required by their permit. Extensive use or new access by the permittee is usually addressed with maintenance requirements in their permit, analyzed through the NEPA process, and addressed in the associated decision.

WP2: How does road development and use affect water quality in municipal watersheds?

This is addressed by project on a case-by-case basis. Thus far, use has not been identified as a water quality concern or problem in drinking water source areas.

WP3: How does the road system affect access to hydroelectric power generation?

There are several small hydroelectric facilities on the west slope of the Wasatch Plateau (see WP1).

Special Products (SP)

SP1: How does the road system affect access for collecting special forest products?

The current maintenance level 3, 4, and 5 road system provides adequate access for collecting special forest products such as mushrooms, recreational rock collections, ferns, transplants, Christmas trees, and firewood. If road closure or seasonal closure is considered in a project or watershed analysis, access needs for special forest products will be considered.

Special Use Permits (SU)

SU1: How does the road system affect managing special-use permit sites (concessionaires, communication sites, utility corridors, and so on??

Special use permits fall into two categories – recreation and land use. The existing road system is sufficient to deal with almost all recreation special uses. Most recreation special use proposals/authorizations are designed around the existing road system. Safe and efficient access to areas under Special Use Authorization has a direct effect on the economics of an operation, either through volume of customers, or operation and maintenance costs.

Access and Forest Service responsibility under ANICLA and RS2477 are discussed in the General Public Transportation (GT) report for this document. The Manti-La Sal National Forest has about 350 Special Use Authorizations. Many of these uses rely on the existing road access or utility corridors to accommodate construction, operation, and maintenance. Some land use authorizations have no access. Most leasable mineral requests require reconstruction of old roads or new construction to meet their needs. These requests are analyzed through the NEPA process and are address in the associated decisions at the project scale.

General Public Transportation (GT)

GT1: How does the road system connect to public roads and provide primary access to communities?

National Forest system roads connect numerous public roads managed and operated by either the state of Utah or county governments. However, few Forest roads serve as the primary through routes that connect communities. Of greater importance is how the county roads and state highways give communities, tourists, and industries access to the Forest.

These roads connect to arterial, collector, and local forest roads where the traffic is dispersed into the Forest for a variety of uses. Some county or state roads traverse into or through the Forest.

GT2: How does the road system connect large blocks of land in other ownership to public roads?

The amount and dispersion of private and other ownership lands vary across the four geographic areas. Arterial and collector roads access most of these lands. However, local roads access some. Access needs to inholdings are addressed on an individual basis as requests are received. Forest Service policy is that access will be provided to a level that is reasonable and suitable for the uses occurring on the land. When landowners desire access, they are asked to apply for a special use or road use permit. The application is analyzed through the NEPA process to determine possible environmental effects and the level of reasonable access required. Access is normally limited to summer or non-snow periods, but on occasion, permits are issued for snow plowing during the winter. Responsibilities for improvements and maintenance are determined through a commensurate share process. If access is being provided by a public road agency such as the county or state, then the Forest Service may not be obligated to provide any additional access over federal lands.

GT3: How does the road system affect managing roads with shared ownership or with limited jurisdiction? (RS2477, cost share, prescriptive rights, FLPMA easements, FRTA easements, DOT easements)

Numerous roads crossing the Forest fall under the jurisdiction of agencies other than the Forest Service. Cooperative agreements are established to share road improvement and maintenance responsibilities with the respective counties. The Forest Service, Federal Highway Administration, and the Utah Department of Transportation signed a Memorandum of Understanding (MOU) in 1997. This document sets forth general procedures for planning, programming, environmental studies, design, construction and maintenance of designated forest highways. For a listing of forest highways on the Manti-La Sal currently designated by the Federal Highway Administration, refer to Table 4 in Chapter 2.

Portions of some forest highways are still under the jurisdiction of the Forest. When funding is secured and improvements are made to bring these sections to secondary highway standards, they will be turned over to the county. The Forest needs to cooperate with these agencies by supporting them in their efforts to obtain funding through the Federal Lands Highway Program.

At present, there are formal agreements between the Manti-La Sal National Forest and seven of eight Utah counties and one of two Colorado counties to share in road operations or maintenance. These agreements identify county and forest system roads that would benefit from cooperation for maintenance and improvements needed for public, administrative, and commercial access through the Forest.

There are no cost-share agreements with private or public landowners on the Forest. The diversity of ownership and lack of any sizable inholdings does not indicate a need to pursue agreements of this type.

Rights of access by law, reciprocal rights, or easements are recorded in Forest files and county courthouse documents. The Forest recognizes these rights and works with the owners to preserve access while protecting the natural resources and facilities on adjacent NFS lands.

GT4: How does the road system address the safety of road users?

In 1975, the Forest Service developed a Memorandum of Understanding with the Federal Highway Administration that required the Forest Service to apply the requirements of the national highway safety program, established by the Highway Safety Act, to all roads open to public travel. In 1982, this agreement was modified to define "open to public travel" as "those roads passable by four-wheeled standard passenger cars and open to general public use without restrictive gates, prohibitive signs…" Most roads maintained at level 3, 4, and 5 meet this definition. Design, maintenance, and traffic control on these roads emphasizes user safety and economic efficiency.

The largest proportion of road maintenance and improvement funds allocated to the Forest is spent on these higher maintenance level roads. Safety work such as surface maintenance, roadside clearing, and installation and maintenance of warning and regulatory signs are performed on an annual basis. Traffic control signing follows standards set forth in the

Manual on Uniform Traffic Control Devices (MUTCD). Exceptions are permitted where state or county practices on similar public roads deviate from these guidelines. Signing should conform with local practice in situations where use of MUTCD guidelines would be confusing to the motorist.

Often, when accidents occur on Forest roads, the Forest Service is not immediately informed unless an employee is involved. Accidents involving only public motorists are reported to the local sheriff or state patrol, if reported at all. When the Forest does become aware of an accident, an investigation is initiated to attempt to identify the cause. If a feature of the road is found to be unsafe, addressing the condition becomes a high priority.

Road condition surveys conducted in 1999 and 2000 reveal a backlog in deferred health and safety work items on level 3 and 4 roads. A large portion of this backlog is a result of deteriorated surfacing on aggregate-surfaced roads. In the past, road-resurfacing projects were planned as part of commercial timber sale activities. The decline of this program has reduced the Forest's ability to fund this work. Built originally for commercial use, design considerations did not emphasize the high volume of public recreational traffic that the roads are experiencing today. Many road sections are lacking sight distance, turnouts, and adequate lane width for the current volume and speed of traffic. Another high-cost item is roadside brushing. Level 3 and 4 roads need to be placed on a recurring schedule to maintain sight distance and a safe clear zone. While this work has been part of the annual maintenance program, it is often dropped in years when budget allocations are down. Finally, warning and regulatory signing contributes significantly to the backlog. Sign maintenance after installation is part of the annual maintenance program of work.

Maintenance level 1 and 2 roads that intersect higher standard roads need to be clearly distinguishable from those that are managed for passenger car use. This can be accomplished in a variety of ways. The surface type and condition of the lower standard road should convey the impression that a high clearance vehicle is needed. The road number sign should be vertically aligned and not the distinctive or rectangular shaped signs used on level 3, 4, and 5 roads. The closure device on roads that are maintained at level 1 should be visible from the intersection or have a clear warning sign for traffic approaching the closure. During watershed and project-scale analysis, Forest officials should give high priority to recommending decommissioning of roads that pose the greatest risk to public safety.

Travel management regulations are posted on the ground and described on the Forest Travel map. These regulations have been established by the Forest to enable safe motorized travel while protecting natural resources and minimizing conflicts between users.

Administrative Use (AU)

AU1: How does the road system affect access needed for research, inventory, and monitoring?

The road system provides adequate access for research, inventory, and monitoring activities of the Manti-La Sal National Forest. The 1986 Manti-La Sal Forest Plan's Management Prescription RPI (Research, Protection, and Interpretation Units) was applied to Research Natural Areas (RNAs) and areas of special interest for interpretation or viewing (Forest Plan, page III-83 thru 87). The Plan's standards and guidelines prohibit or restrict motorized vehicle use as appropriate in RNAs, and roads and trails will not be authorized. Camping is limited or restricted as necessary. Wildland fires are suppressed using minimum impact suppression techniques.

AU2: How does the road system affect investigative or enforcement activities?

The level 3, 4, and 5 road system on the Manti-La Sal National Forest generally provides good access for investigative and enforcement activities. These roads provide access to developed and dispersed recreation sites where many common violations occur. These roads also provide access to many developed trailhead parking areas for the trail system that provides backcountry access. While the road system provides access to perform investigative and enforcement activities, it also provides access for increasing public use of the NFS lands; hence, the Forest is experiencing an increase of criminal activities.

The FY2000 Draft Law Enforcement (LE) Plan for the combined forests lists five major criminal problem areas: 1) travel management, 2) unauthorized uses, 3) theft of forest products, 4) minors in possession of alcohol and illegal drugs, and 5) residential occupancy. While this Draft LE plan identifies several causes for each of these major criminal problem areas, they are all facilitated by the existence of a good road system.

Off-road motorized travel, primarily ATV use, is the most common travel management violation, and the level 3, 4, and 5 road system provides access for these vehicles. The demand for ATV opportunities on the Forest is increasing, suggesting a need for more designated ATV trails. People driving around closed gates on level 1 roads are another travel management problem. With the implementation of the Manti-La Sal Travel Management Plan, the Forest has a tool to address user-created routes and unclassified roads.

Most of the unauthorized uses are in the form of illegal outfitting and guiding. Many of these violations are directly related to the level 3, 4, and 5 road system when non-permitted commercial driving tour operators attempt to derive a profit from this road system. These roads also provide access to the backcountry trailheads where non-permitted commercial snowmobile and hunting activities occur.

Theft of forest products is usually related to the level 3, 4, and 5 road system. These violations mostly involve thefts of firewood, transplants, and Christmas trees. Most years, some commercial level thefts of these products occur. Sawtimber theft is also dependent on the road system because it requires large log hauling vehicles.

There are increasing incidences of minors in possession of alcohol and illegal drugs on the Forest. Much of this activity is in the form of evening partying, which often occurs near urban areas just off level 3, 4, and 5 roads. These gatherings often result in other resource and property vandalism.

While the road system on the Forest facilitates illegal activities, there are no known direct road-related causes of significant illegal activities.

Protection (PT)

PT1: How does the road system affect Wildland and Prescribed Fire Management on the Forest?

The Manti-La Sal National Forest road system provides adequate access for wildland fire response and fuels management. The four most common forest vegetation types on the Manti-La Sal National Forest are spruce-fir, aspen, ponderosa pine, and pinyon-juniper. Generally, ponderosa pine stands and pinyon-juniper are concentrated on the La Sal and Abajo Fire Management Units (FMUs) at elevations 8,000 feet and below. Spruce-fir and aspen stands occur more generally on the Manti and San Pitch FMUs common to northern aspects, in drainages, and at higher elevations. Mountain brush including Gambel oak and sage is common as understory vegetation in ponderosa pine and south aspect facing slopes.

The Forest has recently initiated wildland urban interface hazardous fuel reduction planning and implementation projects. Future planning and implementation projects should occur during the next several years. The focus of much of this fuel reduction planning is the urban interface, particularly the issue of public and firefighter safety in these areas. Urban interface areas consist of summer cabins, developed recreation sites, administrative sites, electronic sites, and year-round homes. These areas generally have an adequate road access system for fuels management projects, including commercial harvest to meet fuel reduction objectives. The Forest is also prioritizing prescribed fire and fuels treatments including suppression emphasis in the short interval fire regime vegetation types where urban interface improvements are present. Closely prioritized with these areas are municipal watershed sites, which range through all vegetation types on the Forest.

Additionally the Forest has implemented Wildland Fire Use and designated Fire Management Areas where management of natural ignitions will be permitted for resource benefit. These areas are unroaded, backcountry locations with limited road access and include inventoried roadless areas and wilderness. Due to the nature of these fires, road access is not a critical factor. Wildland Fire Use normally utilizes landscape features such as vegetation changes, natural barriers, and forecast weather patterns to limit fire size inside maximum manageable areas.

PT2: How does the road system affect the capacity of the Forest Service and cooperators to suppress wildland fires?

The Manti-La Sal National Forest including cooperators use hand crews and engine units as primary suppression firefighting resources. Hand crews are outfitted with 4x4 heavy-duty pickups. Engine units are 4x4 and can negotiate all main forest roads.

The San Pitch FMU and the western sections of the Abajo FMU contain lower road density than the other Forest FMUs. The Forest road system directly affects the response time for initial attack by local resources. During periods of high fire severity where response time is critical to avoid escaped fires the Forest can normally rely on helitack crews, smoke jumpers, and aerial delivery of fire retardant. In examining past fire activity, the lack or condition of roads has not been identified as a primary factor in escaped fires.

A number of private land inholdings on the Forest are currently developed as residential subdivisions or in planning and partial stages of development. These sites contain roads in various conditions and vehicle capabilities. In some cases, road access for firefighting ground resources is not adequate or unsafe due to steepness and/or poor secondary escape routes. Private, state and volunteer fire resources have the responsibility for first response to fires on private inholdings, however in many instances federal resources are requested to assist.

One area that needs further study is road access to surface water storage sites on the Forest and adjacent non-Forest lands. The ability of engines and water tenders to reach these sites for water re-supply can be critical on fires where engine units are key suppression tools. The lack of open water on the Forest and in some cases restrictions on using culinary reservoir water sources due to drought, adds to the importance of being able to reach other water sources.

PT3: How does the road system affect risk to firefighters and to public safety?

The biggest issue related to road systems and public and firefighter safety is probably the mix of fire suppression vehicles and public vehicles. There is an elevated risk of vehicle accidents between suppression vehicles responding to or supporting a fire and the commuting public. This risk is greater with initial attack responses than extended attack large fires. During large fire activity, road restrictions can be instituted limiting or closing road access to the public. Well-signed roads, which note road hazards, can partially mitigate this risk. Strong enforcement of road use regulations such as vehicle speed would also help.

During average fire seasons, the Manti–La Sal National Forest is not considered a high fire occurrence location or area prone to large fire activity. The natural mosaic of vegetation types and limited urban interface problems does not create a host of critical road system issues related to wildland and prescribed fire management on the Forest.

PT4: How does the road system contribute to airborne dust emission resulting in reduced visibility and human health concerns?

Air quality impacts from the Forest road system are associated with vehicle emissions and dust from traffic on unpaved roads. These effects typically are localized and temporary, and their extent depends on the amount of traffic. Dust from unpaved roads increases with dryness as well as vehicle weight. Forest roads are usually unpaved and used for recreational purposes (such as passenger car and four-wheel-drive use), as well as resource management purposes related to livestock grazing, timber harvest, coal mining, and oil and gas development.

Motorized recreation occurs year-round. Summer use includes off-highway, two-wheel and four-wheel drive vehicles. When these vehicles travel on unpaved surfaces, they can stir up dust. The air quality data previously collected does not show any adverse impact to the air resource on the Manti-La Sal National Forest. As use of Forest roads increases with visitation, road dust impacts to sensitive areas may need to be addressed.

Vehicular travel on unpaved roads is heavy during resource management activities such as timber harvest, mining, and oil and gas development. These uses typically require dust abatement measures to reduce the air quality impacts of sustained and heavy traffic use. The Forest has applied dust abatement products to higher public use Forest roads that pass through or near residential areas as part of its annual maintenance plan when funds are available. Other mitigation measures such as reducing haul speeds, watering, limiting the number of trips per day, and the timing of operations may be necessary. On unsurfaced roads, temporary increases in dust emissions occur during and after routine surface maintenance when conditions are dry. Watering during blading or scheduling maintenance when natural moisture content is higher would help reduce dust emissions.

Specifying the type of dust abatement product or method and frequency of use is not a programmatic issue. This is a relatively expensive activity and is dependent on budget levels and priorities. Dust abatement should be considered as a mitigation measure for higher traffic volumes resulting from commercial activities and special use permits, particularly on arterials and major collectors and when traffic is expected near developed recreation sites. It should also be considered on higher volume roads that are in riparian areas where dust could have unacceptable affects to sensitive plants and animals.

Recreation – Unroaded (UR) and Roaded (RR)

Recreation (UR1, RR1) Is there now or will there be in the future excess supply or demand for roaded or unroaded recreation opportunities?

Assuming the public will continue to pay more for gasoline, the demand for unroaded recreation will continue to increase. Excess (unmet) demand will occur at some point in the future. Currently, excess demand occurs on holiday weekends and during the hunting season. Evidence of growing demand elsewhere includes initiation of wilderness and trail permit systems, development of temporal zoning (even/odd day recreation for different users), and the increase in Fee Demo projects to fund growing maintenance backlogs. Locally, increased use of Dark Canyon has been noticed because of Bureau of Land Management (BLM) fees in Grand Gulch.

Driving for pleasure is an activity for which 32.7% of Forest visitors reported participation, and 6.3% reported it was their only activity on the Forest (National Visitor Use Monitoring Survey 2002).

UR2 and RR2: Is developing new roads into unroaded areas, decommissioning of existing roads, or changing the maintenance of existing roads causing substantial changes in the quantity, quality, or type of unroaded (or roaded) recreation opportunities?

Road development would reduce the supply of unroaded recreation opportunities and displace visitors who seek an unroaded experience (including motorized trail riders). Visitor displacement occurs when favorite locations are developed or opportunities to use these sites reduced. Resource damage, including pioneering of access to experience an unroaded setting, would occur. Decommissioning of roads would improve the supply of unroaded recreation, even if these roads were converted to trails. Changing the maintenance level of roads, to a higher level, would likely bring more visitations to the Forest placing further demands on unroaded opportunities. Lowering maintenance levels would not reduce visitation. Instead it would tend to concentrate visitation near the end of the road best suited to passenger vehicles (level 3) or high clearance vehicles (level 4) and may increase the amount of illegal ATV use by visitors wanting to experience an unroaded, more wildland like setting.

UR3 and RR3: What are the effects of noise and other disturbances caused by developing, using, and maintaining roads on the quantity, quality and type of unroaded (and roaded) recreation opportunities?

Over 60% of Forest visitors state they come to the forest to get away from noise and other aspects of urban living. Further road building would predictably reduce opportunities for a quiet forest experience and generally degrade unroaded recreation. Developing, using, and maintaining roads would force visitors into areas where these activities do not occur.

UR4 and RR4: Who participates in unroaded (and roaded) recreation in the areas affected by constructing, maintaining, and decommissioning roads?

Over 900,000 forest visitors came to the Manti-La Sal National Forest during 2001 and of those, over 70% stated they participated in activities that could be accomplished in unroaded areas. Visitors to the Forest come from four general areas: 3% from outside the US, and from within the US, 44.5% from adjacent counties and cities, 37.5% from the Wasatch Front, and 18% from the remainder of the country.

UR5 and RR5: What are these participants' attachment to the area, how strong are their feelings, and what are alternative opportunities and locations available?

Locals and visitors from the Wasatch Front are often attached to specific areas of the Forest, due to a history of using these areas for generations. Because of these strong attachments, there is resistance to alternative opportunities and locations.

UR6 and RR6: How does the road system affect the Scenic Integrity? How is developing new roads, decommissioning of existing roads, or changing the maintenance of existing roads into unroaded areas affecting the Scenic Integrity?

Scenic Integrity indicates the degree of intactness and wholeness of the landscape character. Human alterations may raise, maintain, or lower the intactness of a landscape. In the case of roads, development could only maintain or even lower the scenic integrity level for landscape character.

Forest visitors will drive the roads to view outstanding scenery and will enjoy their experience. For them, the road becomes a part of the scenery and is acceptable to their experience. On the other hand, for the visitor who views the Forest from more of a purist standpoint any development, including roads, could deviate from the intactness of the landscape character.

New road development can be compatible with Scenic Integrity levels in a landscape, as long as basic design elements become a part of the whole picture, such as form, line, color, and texture. A road which has flowing lines, established cut and fill banks, and fits well with the landform could add to, or at least maintain, the intactness of the landscape; whereas, a road that does not fit well with the landscape could lower levels of landscape intactness.

Because the old roadbeds and visual scars will remain, decommissioning of existing roads will not have much affect for the first few years. In the long-term, grasses and vegetation will become established, and the visual effects will fade and disappear. Decommissioning would have a beneficial effect after vegetation becomes established.

Changing maintenance levels will not have much of a visual effect on the landscape, because existing cuts and fills will remain apparent.

The effect of roads on Scenic Integrity needs to be analyzed at the project level using the Visual Quality Objectives (VQO) for the particular area. The visual qualities that are the objectives for a particular area would determine the degree of effects of developing new roads, decommissioning of existing roads, and changing the maintenance of existing roads in unroaded areas.

Passive-Use Values (PV)

Questions PV 1-4 have been combined into the following question.

PV3: Who currently holds passive use values and what will be the potential effect, positive and negative, of building, closing, or decommissioning roads on passive-use values?

This does not neatly fall into either a watershed scale or a forest scale issue. Forest visitors have specific areas and landscapes that are of interest to them. Local populations have modern historic roots in the area with attachments at different scales. Other groups of people (environmental groups) have a more generic interest in unroaded areas, and they operate at a forest wide scale.

Social Issues (SI), Civil Rights and Environmental Justice (CR)

SI-1: What are peoples perceived needs and values for roads? How does road management affect people's dependence on, need for, and desire for roads?

The Utah public use roads to drive to their destinations because communities and places in the rural areas are so far apart. Higher-level roads in the southeast portion of Utah were some of the last to be constructed and are used as major east/west corridors. Roads are used to transport goods and access recreation and commercial opportunities. Well-maintained roads facilitate recreation and commerce; poorly maintained roads make travel difficult or impossible. Roads are not always viewed as beneficial. Many people feel the national forests have too many roads and no further road construction is necessary. Others view roads as beneficial to their experience and to forest management.

La Sal Mountains

Visitors want comfortable roads to drive to scenic places on the Forest. The La Sal Loop Road takes a traveler to an elevation of 8,300 feet at the base of the sheer laccolithic lower slopes of the La Sal Mountain peaks. This opportunity is especially important for the elderly, young children, and for those with access disabilities. The highway is paved, so it provides for comfort as well as convenience. Local citizens and tourists use the La Sal Loop Road in both summer and winter. As a State Scenic Backway, the road is featured in national and state publications.

Abajo Mountains/Elk Ridge

The Abajo Mountains/Elk Ridge features two State Scenic Backways. Indian Creek Road (FSR50099) (The Abajo Loop) takes visitors by the Horsehead Peak (a natural feature formed by trees and rock) and North Creek Pass, which is the primary watershed for the cities of Monticello and Blanding. Horsehead Peak has great significance to the people of Monticello. The road has spectacular views of the four corners area and Canyonlands National Park. The Elk Ridge road begins west of Blanding and passes through Bears Ears Mountain, a sacred site for the Navajo Indians. This road offers scenic panoramas of Canyonlands National Park, Dark Canyon Wilderness, and Monument Valley. Other major roads in this section provide north/south access through this sparsely populated country.

Wasatch Plateau

The Wasatch Plateau section of the Forest divides the east and west portions of the state. It was important for settlement and commerce to have safe and established routes across the mountains. Today paved roads provide east/west access to communities across the mountain as well as important transportation corridors for energy development and recreation. The Wasatch Plateau features a National Scenic Byway and several State Scenic Backways. The Energy Loop: Huntington and Eccles Canyons National Scenic Byway was designated in 2000. The road features the mineral development along that corridor. The byway is used to haul coal and timber, for recreation purposes, and as east/west access. The road corridor tells the history of the two counties it connects. The two State Scenic Backways in this area are Skyline Drive and Ferron-Mayfield. Skyline Drive Scenic Backway runs north and south the entire length of the plateau and offers spectacular vistas of the Oquirrh Mountains, Mt. Nebo, distant valleys, and the Roan Plateau. The Ferron-Mayfield Scenic Backway which runs east and west is noted for reservoirs, scenery, and camping opportunities. For the most part, local residents feel there are an adequate number of roads to meet public needs. Additional road development is viewed as a deterioration of the watershed that affects local culinary water supplies.

San Pitch Mountains

The Forest road system provides the communities around the San Pitch Mountains with most of their access. Access is primarily needed for grazing although recreation and hunting are popular in the fall. The terrain in this area makes road building and travel difficult. This section features the Chicken Creek Road Scenic Backway. The road corridor offers spectacular viewpoints and outcrops of sandstone and rock.

SI-2: What are people's perceived needs and values for access? How does road management affect people's dependence on, need for, and desire for access?

Most of the major roads in the Forest were built to access energy development, grazing allotments, or to harvest timber. Once people have legal access by road to an area, that area becomes somebody's favorite place.

Energy development and grazing continue to be important economic factors in the communities surrounding the Forest. In addition, scenic qualities of the Forest have been recognized by a growing number of people outside the area, and more visitors are coming to the Forest to recreate and view scenery. They feel a good transportation system allows them appropriate access. In addition, according to the latest census, the population in communities around the Forest is aging. There is an influx of retirees moving into the area from other states who desire developed access points, identified trails, and better facilities. While some in the older age group prefer easier access to their favorite recreation spots, others want access to trailheads to discover the backcountry. In either case, a well-designed road system is imperative for their access.

San Pitch Mountains

There is limited public access to NFS lands in the San Pitch Mountains. Hunters depend on a certain amount of access to get to their hunting area. If access to an area becomes unavailable, the hunt may not take place as planned. Grazing continues to be an important economic and social factor in the lives of those living in the Sanpete Valley; access to their allotments is important.

Abajo Mountains/Elk Ridge, Wasatch Plateau, and La Sal Mountains

Year-round accessible recreation opportunities are important to nearly all residents in the valleys around the Forest. Getting to the Forest and to favorite spots is extremely important, as evidenced by the list of favorite sites mentioned in county plans. Historically the Forest has offered a wealth of mineral exploration and development. The wealth generated from production of mines has been a major influence in the development and well being of the surrounding communities.

SI-3: How does the road system affect access to paleontological, archaeological, and historical sites?

Many historical, paleontological, archaeological, and historical sites along arterial, collector, or local roads have been recorded, and *some* have been excavated. Most sites have not been interpreted in order to retain scientific values. A road system increases access to sites, making them more accessible for vandalism and theft of artifacts.

SI-4: How does the road system affect cultural and traditional uses (such as plant gathering, and access to traditional and cultural sites), and American Indian Treaty Rights? SI-9: What are the traditional uses of animal and plant species within the area of analysis? *SI-4 and SI-9 have been answered together.*

The road system has positive and negative effects on such sites. The degree of isolation of these sites is important to traditional users. They had been used long before there were roads. The road system allows other users and non-traditional users access to the same areas, which can cause conflicts and a loss of the values important to Native Americans. Effects can extend beyond individual watershed boundaries.

SI-5: How does road management affect historic roads? (*This question has been re-worded)*

Historic roads would be affected by upgrading the standard to which the road is maintained. There are several historic roads on the Forest (though they have not yet been evaluated for National Register Status).

****SI-6: How may local community social, and economic health be affected, positively and negatively, by road management (for example, lifestyles, businesses, wood products, tourism industry, infrastructure maintenance)?**

Road management is subtle, yet necessary to Forest management. Use of the Manti-La Sal National Forest is dependent on proper, timely road management. Commodity users rely on the existing road system, as do pleasure seekers. For many communities in the West, the road system is the backbone of commerce, providing for the movement of products and people through the Forest and to other communities. Most of the roads in the Forest were built to facilitate timber harvest, grazing, oil and gas development, and recreation. Today, the majority of traffic is from recreation use and energy development in specific areas.

Recreation traffic includes local and non-local users, many of whom are sight seeing. Across the NFS, managers have indicated that nearly 40% of Forest use is by people who never get out of their vehicles. Approximately 50% of the recreation users on the Wasatch Plateau are from the metropolitan areas of Salt Lake City, Orem and Provo. A high number of national and international visitors, as well as those from the metropolitan areas of the Wasatch Front, tend to visit the La Sal Mountains and the Abajo/Elk Ridge sections.

For some local recreationists, tourist traffic has become an annoyance. Tourism is a double-edge sword. For every comment that tourism is a benefit to the economy, there is a comment concerning crowding and over use. A properly designed and coordinated road system can direct publics to nearby communities for goods and services instead of allowing travelers to pass through the Forest without stopping at local businesses.

Our urban users expect to go long distances quickly and to be able to travel through the Forest in comfort. There is a prevalence of level 3 and 4 (built for comfort) native surface and gravel roads. Maintenance is increasingly important to facilitating the demands of these urbanites.

SI-7: What is the perceived social and economic dependency of a community on an unroaded area versus the value of that unroaded area for its intrinsic existence and symbolic values?

or SI-7: For communities adjacent to the Forest with industries dependent upon Forest –related resources (wood products, mineral, grazing, tourism), what are the local values of currently unroaded areas surrounding the communities? These may include the value of roading the area for continued access to resources, expanded roaded opportunities, or maintaining unroaded areas and opportunities.

Some communities highly dependent on resources are more vocal than others on this topic. For many local people, unroaded areas are there for a few to enjoy. These residents see roads as imperative to the management of the Forest, for energy development, grazing, or recreation.

Other residents believe that the Manti-La Sal National Forest has too many roads and not enough unroaded areas. These recreationists often complain they cannot walk a mile in any direction from a road without running into another road (classified or unclassified) despite the 319,738 acres of inventoried roadless areas on the Forest.

Wasatch Plateau

The Wasatch Plateau is primarily the energy development, recreation, and grazing portion of the Forest. Its location provides easy access to Wasatch Front residents and is extremely desirable for recreation. The current road system appears to sufficiently disperse this use; however, concentration areas are becoming evident, requiring more intense management. There are few opportunities to increase the miles of maintained roads, and there is no impetus to close any of the level 3, 4, or 5 roads in this area. Maintenance of existing roads is imperative for continuing the dispersal of these users, most of whom are pleasure driving for scenery or just accessing favorite areas for day-use activities.

Abajo Mountains/Elk Ridge and La Sal Mountains

Again, the community is divided in their interest for roaded versus unroaded areas. Many long time residents see these areas as places to provide high-income wages from resource development or as "their" mountain for recreation use. Others, including national environmental groups, see growing impacts from recreation and resource use. They would like to see lands protected from further development.

San Pitch Mountains

Most of the San Pitch Mountains are within inventoried roadless areas. Local residents, grazing permitees, and hunters would like to see this area opened up. Environmental groups and some national interests would like to maintain or increase the current unroaded opportunities.

SI-8: How does road management affect wilderness attributes, including natural integrity, natural appearance, opportunities for solitude, and opportunities for primitive recreation?

There is one wilderness area on the Manti-La Sal National Forest. The Dark Canyon Wilderness area is located in the Abajo Mountains/Elk Ridge. The only issues relevant to this question are dust and unauthorized motorized use facilitated by the road system.

SI-10: How does road management affect people's sense of place?

People's sense of place is directly tied to the aspects of an area, including the area within a road corridor, that invoke a special feeling or attachment. Factors include the area's vegetation, the amount of sunlight available, the views, the solitude, the opportunities that make it a destination, and familiarity with the area. The road facilitates the type and amount of use. The design and course of the road allow individuals to see various aesthetic attributes visible alongside the road. These attributes are directly related to road management. Forest roads provide a variety of enjoyment, open views of wide vistas as well as confined narrow roads where the forest comes in close to the traveler. Any change in road management or the development of a road without considering these things will create a change in current use.

If a road is managed as a level 3 and the decision is made to upgrade it, additional users with different values might begin to use the area. This will change the character of the area for users who consider the area special. It will change the user's experience and may displace them to other areas for their recreation activities. Conversely, a road currently managed as a level 5 and downgraded in maintenance will not be as drivable, and the area will become inaccessible for some current users. This problem is evident for the elderly who have used the area for years. Because a variety of different people uses the existing road system, they need to be considered before changing road management.

CR1: How does the road system, or its management, affect certain groups of people (minority, ethnic, cultural, racial, disabled, and low-income groups)?

The road system is used by all groups of people. Changes in road management, including closing or decommissioning of any roads would have an effect on all groups of people, including minorities and different cultures. Changes in road management have a great effect on the disabled and elderly who have no means of access other than mechanized. Lower road standards negatively affect low-income groups who may not have suitable modes of transportation (ATVs and OHVs) to use lower standard roads.

Chapter 5 Describing Opportunities and Setting Priorities

Problems and Risks Posed by the Current Road System

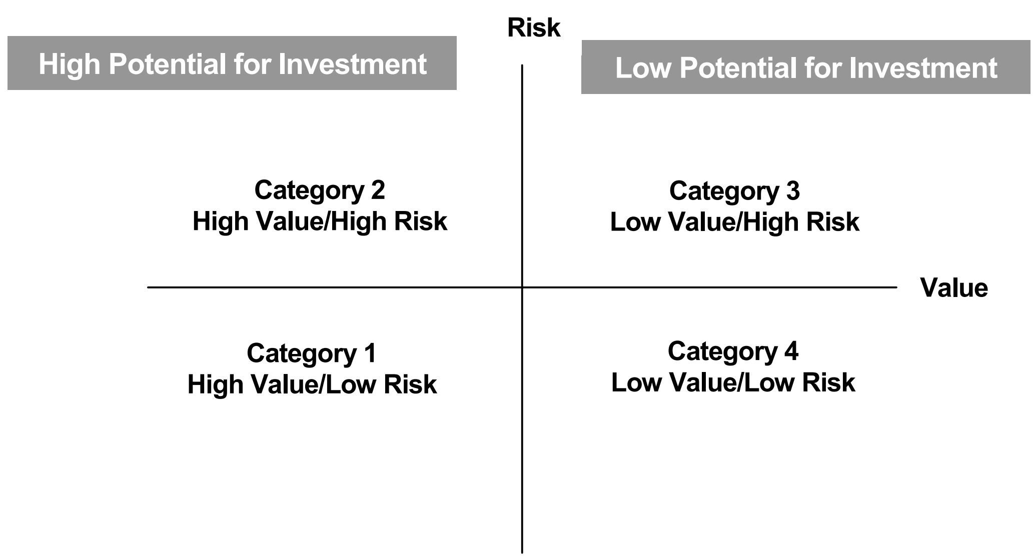
Introduction

To assess the problems and risks posed by the current road system, the IDT evaluated the primary transportation system on the Manti-La Sal National Forest using the following tools: a GIS assessment, a road matrix, and a road management graph. There were some inherent limitations in the data used. The available GIS data for each resource area was not complete. However, the watershed and aquatics databases were more complete and were adequate for a GIS-based analysis. These were also the resources at most risk from road-related impacts.

GIS Assessment: The effect of roads on the watershed and aquatic resources was analyzed using GIS computer technology combined with the Forest transportation inventory and cartographic feature files.

The Road Matrix (Appendix B) lists every road considered part of the primary transportation system. This includes most of the objective maintenance level 3 and 4 roads on the Forest as well as the objective maintenance level 2 collector roads. The matrix assigns low, moderate, or high values to resources, and includes annual and deferred maintenance costs. This is a broad assessment, so the detail and accuracy for road risk and values contain a degree of subjectivity and potential for inaccuracies. However, this road matrix provides road-specific information that will help define the potential minimum road system, identify roads that pose high risk to other resources, and prioritize subforest scale projects. As more information becomes available, the road matrix information should be validated and updated.

The Road Risk-Value Graph (page 51) was developed to display the information in the road matrix. It categorizes the values and risks of the current road system and helps identify opportunities for managing the road system and prioritizing expenditures of Forest road maintenance and improvement funds. This graph is only a management guide; it is not firm direction as it combines many of the road matrix risk and value variables.



Resource Risks versus Road Use Values

The risks and values from the road matrix (Appendix B) and the road management graph are defined below.

Road-Related Risks

Watersheds and Aquatic: Watershed risk was developed through GIS analysis (Appendix A) using 5th level watersheds. Road segments in each watershed were assigned the appropriate risk level (high, medium or low). This was intended to guide subforest scale analysis.

Wildlife Risks: Many scientific studies have documented impacts to wildlife, including direct mortality, habitat fragmentation, edge effects, viability and sustainability, and nesting and rearing disturbances. The IDT utilized these studies as well as the Forest's annual monitoring reports to evaluate wildlife risks. The monitoring reports clearly demonstrated that the current road system has minimal effects on the management indicator species listed in the Forest Plan. Most of the wildlife risk values assigned to each road on the Forest were low, a few were moderate, and none were in the high category.

The nearness to roads of important habitat characteristics was used as the main criteria in determining the rating. Each road segment was rated as having a High (H) = serious risk; Moderate (M) = moderate risk; or Low (L) = low, or no known risk to federally listed endangered and threatened species, and Forest Service sensitive species. The important habitat characteristic for bird species with a relative low tolerance for disturbance was nests near a roadway. For plant species, it was the occurrence of the plant in or immediately adjacent to the roadway.

More information about road impacts to wildlife on the Manti-La Sal National Forest can be found in the TW section (Chapter 4) of this report.

Financial Risks: Annual and deferred maintenance costs were included in the risk/value categories for the road management graph. These costs were included to reflect the Forest's financial commitment to maintain the road system and to identify the link between maintenance and resource protection. If basic annual road maintenance (such as drainage maintenance) is not performed, roads have an increased potential for loss of investment and environmental damage. The same is true for deferred maintenance, such as replacing major culverts in perennial streams at the end of their service life. A catastrophic drainage failure will have a direct negative impact on the associated watershed and aquatic health.

Wet Travel Factor: Most of the native soils on the Forest are high in silt and/or clay content making the majority of native surfaced roads extremely slick under wet conditions. The wet travel factor was established based on existing surface type. Roads with a native surface were given a poor rating, roads with select native surfacing were given a fair rating, and roads with aggregate surfacing or pavement were given a good rating.

Engineering Concerns: Factors such as geology, soils, slope, and past development activities affect the costs and difficulties of maintaining or improving a road. These factors become concerns when they lead to excessive erosion of the road surface and prism, tendency for rutting, or slope failure that could damage or remove portions of a road. Engineering concerns are rated high, medium, and low. Development of redundant alignments is also considered an engineering concern. Such conditions occur in areas of mining, timber development, or OHV use.

Road-related Values: Value was determined by looking at resource management and recreation uses.

Resource Management Values: This value was based on two factors: road length and the variety of land and resource management access needs provided by the road. Initially, each road was given a default value rating based on its length. Roads 10 miles in length or greater, received a high value rating. Roads from 1.0 to 9.9 miles in length were given a moderate value. Roads less than 1.0 mile long were rated low. For the second step, the following criteria were used on a road-by-road basis to adjust the default values.

- Access to suitable timber base.
- Access to rangelands.

- Access to private land.
- Access to electronic sites.
- Access to key administrative facilities.
- Access to water production or storage facilities.
- Access for minerals exploration and extraction.

These criteria were used either alone, in cases where one use was very important for management of that resource, or in combination where the road served two or more access needs.

Recreation Use Values: The value of recreation use of the road system was rated separately. High values were assigned to roads that provided direct access to developed recreation sites or were key recreation access roads to the Forest. Moderate to high values were assigned to dispersed recreation areas along roads with heavy summer and fall use. Low values were often assigned to roads that provided only seasonal dispersed recreation use.

Road System Modification Options

After performing a road-by-road rating of risk and value based on the established criteria, the following road management categories and graph were developed to display the information and present opportunities for road management. The matrix and watershed assessment provide a basis for subforest scale roads analyses. The graph used in conjunction with the road matrix table (Appendix B) helps to identify the potential minimum road system (roads that have a high value, categories 1 and 2), roads that may need additional investment to protect their resources (roads that are of high risk, categories 2 and 3), and roads that could have their maintenance level reduced (roads that are of low value, categories 3 and 4).

Road Management Categories and Graph

The following four categories of roads were identified based on value and risk. Within each category, there are possible management options for the roads.

Category 1: High Value and Low Risk – Ideal Situation

Options:

- Focus road maintenance funds on these roads to keep them in this category.
- High priority for the Public Forest Service Road designation.
- These roads form part of the potential minimum road system for the Forest.

Category 2 – High Value and High Risk – Priorities for Capital Improvements

Options:

- High priority for subforest scale roads analysis to identify high-risk reduction needs.
- High priority for capital improvement funding, such as PFSR designation, road improvement, road relocation, funding, and capital improvement program.
- Shift road maintenance funds to these roads to keep their resource risks from increasing.
- These roads are the remainder of the potential minimum road system for the Forest.

Category 3 – Low Value and High Risk – Priorities for Risk Analysis

Options:

- High priority for subforest scale roads analysis to identify high-risk reduction needs and confirm use value.
- Potential for reducing maintenance level.
- High potential for reducing traffic and use load and/or functional classification.

Category 4 – Low Value and Low Risk – Priorities for Reducing Maintenance Level

Options:

- Lowest priority for expending annual road maintenance funding.
- Moderate potential for reducing maintenance level and/or functional classification.
- Where there is a recreational demand, convert these roads to trails.

The Road Risk-Value Graph (see following page) was the tool used to identify roads for the above road management categories. Several factors must to be understood to correctly interpret this graph and the identification of roads in the different categories.

Roads with a value of more than 4 (left side of the vertical axis) represent those roads that constitute the Potential Minimum Road System for management and use of the Manti-La Sal National Forest by passenger cars. Those roads with a value of 4 or less are roads that are potentially not needed for use by passenger cars on the Forest, at least possibly not needed at their current maintenance level. The situation is similar for the horizontal axis. Those roads with a risk rating of 10 or more represent roads that may be causing unacceptable resource impacts, while those with a rating of less than 10 are not as much of a resource concern.

Of special note: it needs to be emphasized that just because a road falls below the horizontal axis does not mean it is not causing resource impacts. The risk rankings are a sum of the wildlife, watershed, maintenance costs, wet travel factor, and engineering concerns. Low costs and higher resource risks could still result in an overall ranking of less than 10 (low risk) on the graph. The road matrix (Appendix B) needs to be used with the graph to identify the actual risks that have been assessed through this analysis.

Figure 2. Road Risk-Value Graph

High Potential for Investment | **Low Potential for Investment**

Risk

15

Category 2
High Value/High Risk

Priority for investment
(CIP, PFSR, etc.)
Focus on resource concerns

101.4 miles
$933,786 deferred maintenance
$236,219 annual maintenance

Category 3
Low Value/High Risk

Priority for risk analysis
Consider reducing maintenance level
Consider decommissioning
Focus on resource concerns

9.3 miles
$ 8,683 deferred maintenance
$10,307 annual maintenance

6 — ***(4/10)*** — ***2*** ***Value***

Category 1
High Value/Low Risk

Ideal condition
Maintain to standard
Review for potential resource concerns

544.2 miles
$3,604,193 deferred maintenance
$1,344,923 annual maintenance

Category 4
Low Value/Low Risk

Consider reducing maintenance level
Consider decommissioning
Review for potential resource concerns

18.4 miles
$330,022 deferred maintenance
$ 39,386 annual maintenance

5

Minimum Primary
Transportation System

Note: Not to Scale
Value = Recreation value + Resource management value (maximum = 6)
Risk = Watershed risk + Wildlife risk + (Deferred+Annual maintenance)/2 + Wet Travel + Engineering Concerns (maximum=15)
Horizontal axis: Value of 4 or less = low potential for investment (low value).
Value > 4 = high potential for investment (high value).
Vertical axis: < 10 = low risk.
10 or greater = high risk

Road Maintenance Costs – Identification of the Potential Minimum Road System

One purpose of a roads analysis is to identify ways to more efficiently spend the limited road maintenance dollars allocated to the forests. One approach is to reduce or eliminate expenditures on roads that are not needed or not needed at their current maintenance level. The process described above identifies the Potential Minimum Primary Road System.

Some conclusions can be made by comparing annual road maintenance funding needed for each road to the road maintenance graph. If all of the roads to the right of the vertical axis were to be decommissioned, the needed annual road maintenance funding for just the primary road system on the Forest would be reduced from $1,630,835 to $1,581,142. The actual allocated road maintenance funding for the entire combined Manti-La Sal National Forest has been around $900,000/year. More road maintenance funding is needed to support the road system infrastructure.

Decommissioning Guidelines

Discussion

Road decommissioning results in the removal of a road from the road system. The impacts of the road on the environment are eliminated or reduced to an acceptable level. To accomplish this a number of techniques can be used, such as posting the road closed and installing waterbars, posting and installing barriers and barricades, ripping and seeding, converting the road to a trail, and full reclamation by restoring the original topography. There is a different cost associated with each of these techniques, and their effectiveness for deterring unauthorized motorized vehicle use varies as well.

Decommissioning level 1 and 2 roads can consist of removing the few culverts, ripping and seeding, posting closed with signs, and installing waterbars to discourage unauthorized motorized vehicle use and ensure proper drainage occurs over time.

Decommissioning level 3, 4, and 5 roads is more expensive than decommissioning most level 1 and 2 roads. When choosing a technique for road decommissioning, the objective is to eliminate the need for future road maintenance.

Level 3, 4, and 5 roads are usually wider than level 1 and 2 roads, have culverts installed at designed intervals to cross drain the road, are ditched, have better sight distances designed on horizontal and vertical curves, have larger cuts and fills, and are designed through the topography rather than with the topography. Given the cost, it may be cheaper to maintain level 3, 4, and 5 roads than to decommission them. However, future maintenance costs may not be the only factor to consider; other resource considerations may outweigh the cost. For a particular road (level 3, 4, or 5), high deferred maintenance costs may exceed the costs of decommissioning.

Guidelines

- Balance cost with resource risk and effectiveness of the treatment when selecting methods for decommissioning roads.
- Convert roads to trails as a decommissioning method when analysis of recreation demand indicates a need to expand, connect, or improve the existing trail system in the area. Provide adequate trailhead parking as part of this treatment method.
- Decommission by restoring the road to original contours when the Forest Plan requires mitigating visual impacts or when necessary to assure the elimination of vehicular traffic.

Capital Improvement Guidelines

Discussion

This analysis does show there is a need to reconstruct existing roads to correct deferred maintenance work items or to improve some roads to meet increasing use and traffic requirements. Funding limitations require prioritization of reconstruction work. The Road Risk-Value Graph (page 51) provides a starting point for developing priorities. The following guidelines are to be used in conjunction with the graph when selecting, prioritizing, and implementing road reconstruction and construction projects.

Guidelines

- Conduct road location reviews before all new construction and road relocations. Assure the location meets public and agency needs while mitigating environmental impacts identified in the analysis. Responsible line officers and resource and engineering specialists should participate in the review.
- Continue with the traffic counting program to identify high use roads and traffic patterns.
- Roads with seasonal average daily traffic volumes exceeding 100 vehicles per day should be considered for reconstruction to two lanes.
- Use motor vehicle accident safety investigations and reports to help identify road safety hazards.
- Use the following categories to prioritize road investments planned to reduce deferred maintenance backlog on roads: 1 – Critical Health and Safety; 2 – Critical Resource Protection; 3 – Critical Forest Mission. Data for these work items can be found in the Infrastructure database.
- Coordinate reconstruction and construction work with other agencies whenever possible. Utilize interagency agreements to develop investment and maintenance partnerships.

Road Management Guidelines

- If a road's operational maintenance condition has decreased, consider the need for the road and the historic use, as well as alternative roads in the area before permanently changing the maintenance level.
- Reduce the operational maintenance level on identified low value level 3, 4, and 5 roads being analyzed in subforest scale roads analyses. This can be a cost effective alternative. Reduced maintenance should not result in any increased watershed risks from these roads, as the most basic road maintenance will focus on maintaining road drainage. The reduced maintenance should only result in reduced user comfort, and hence, reduced use over time will further reduce the potential for road related watershed risks.
- It is important for travelers to have the sort of information necessary to make a decision about the road on which they are about to travel. When appropriate, utilize entrance treatments, warning signs, route markers, and information bulletin boards to advise travelers of conditions ahead.
- Do not post speed limit and other regulatory signs on roads under Forest Service jurisdiction without a Forest Supervisor's order and a law enforcement plan.
- To reduce annual maintenance costs, implement seasonal travel restrictions on roads susceptible to damage during wet or thawing conditions.
- Collect road maintenance and surface rock replacement deposits (as appropriate) on all commercial use of classified roads (include timber haul).

General Guidelines

The following are general road related guidelines:

- Require authorized, permitted operations utilizing NFS roads to pay their fair share of road maintenance costs.
- Consider road decommissioning when planning projects that involve the construction and use of short-term, single resource roads. For example, roads planned for mineral projects that undergo exploration, development, and abandonment phases. By incorporating decisions to decommission the single resource roads at the end of the project, rather than not addressing this issue up front, the Forest will better demonstrate a commitment to managing its road system toward the minimum road system needed. Document planned decommissioning in road management objectives.
- Develop an annual maintenance plan to prevent deferred maintenance costs from accruing on high value rated roads
- Update the road system databases and keep them current.

- Use an interdisciplinary process to develop, update, and implement road management objectives for all system roads. Assure that information in the transportation atlas and inventory conforms to approved road management objectives.
- At appropriate intervals, update the data contained in the Road Matrix (Appendix B). Analyze the changes to determine new opportunities that may have developed as new information is collected.
- Incorporate yearly Forest road changes into the annual Forest Plan Monitoring Report (via the forest plan revision process). These road changes can include miles of road decommissioned (classified and unclassified), miles of road converted to trail (motorized and non-motorized), miles of road reconstructed (by maintenance level), and miles of road constructed (also by maintenance level).
- Continue performing road condition surveys on a two-year rotation per current Washington Office direction on objective maintenance level 3, 4, and 5 roads. Continue with condition surveys on the random sample of maintenance level 1 and 2 roads per Washington Office direction.

Opportunities for Addressing Problems and Risks

Travel Management: For roads in the low value rating, decommission, reduce maintenance level, or consider ways to raise this value. For example, provide recreation opportunities along the road. Overall recreation use on the Forest is increasing, and road related opportunities exist to better disperse this use and lessen recreation impacts that are occurring elsewhere. An example of increasing recreation use on a low value road would be to develop a trailhead and trail system at the end of the road. There are many opportunities on the Forest to convert unclassified and level 1 and 2 roads to motorized and non-motorized trails.

Watershed: The following opportunities could remedy road impacts for specific watershed or aquatic situations such as surface/subsurface hydrology and surface erosion.

Opportunities/recommendations to consider if roads are likely to modify surface and subsurface hydrology:

- Design roads to minimize interception, concentration, and diversion potential.
- Design measures to reintroduce intercepted water back into slow subsurface pathways.
- Use outsloping and drainage structures to disconnect road ditches from stream channels rather than delivering water in road ditches directly to stream channels.
- Evaluate and eliminate diversion potential at stream crossings.

Opportunities to address concerns in riparian areas include:

- Relocate roads out of riparian areas.
- Limiting clearing distances in riparian areas during construction, reconstruction, and maintenance.
- Restore the hydrology in riparian areas that have been dewatered by the road system.

Opportunities to reduce surface erosion include:

- Increase the number and effectiveness of drainage structures.
- Improve the road surface by either gravelling or adding a binding material to those roads that have native surfaces with no inherent binder.

Opportunities to address existing roads in areas with mass wasting potential include:

- Relocation to an area with more stable soils.
- Relocation of drainage structures so outlets are on less sensitive areas which may include flatter slopes and better-drained soils.
- Additional drainage structures to reduce the concentration of water at any given location.

- Reducing the maintenance and service level of the road.

Opportunities to reduce the effects of the road system on wetlands include the following:

- Relocate roads out of wetland areas.
- Where relocation is not an option, use measures to restore the hydrology of the wetland. Examples include raised prisms with diffuse drainage such as french drains.
- Set road crossing bottoms at natural levels of wet meadow surfaces.

Opportunities to improve road/stream crossings include:

- Design crossings to pass all potential products including sediment and woody debris, not just water.
- Realign crossings that are not consistent with the channel pattern.
- Change the type of crossing to better fit the situation. For example, consider bridges or hardened crossings on streams with floodplains, and consider bottomless arch culverts in place of round pipe culverts
- Add cross-drains near road-stream crossings to reduce the length of road ditch discharging into the stream system.
- Reduce the number of road-stream crossings to minimize the potential for adverse effects

Opportunities to address road-stream crossings that restrict migration and movement of aquatic organisms include:

- Reset the culvert to eliminate the limiting factor.
- Replace the culvert with an alternative crossing such as bridge, hardened low-water ford, or bottomless arch culvert.

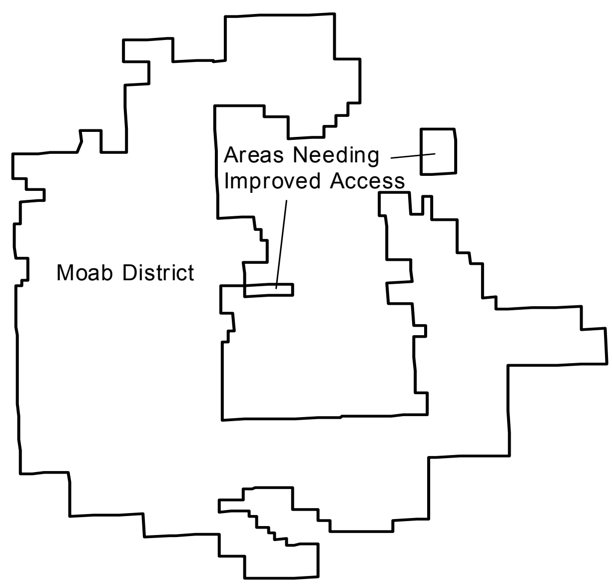
Forest Plan Revision: There are user conflicts between winter motorized and nonmotorized forest users. This roads analysis can be used to help develop revision alternatives that provide passenger vehicle access to high-use areas in the winter. The objective is to separate motorized from nonmotorized users in one of two ways: 1) by establishing separate points of departure into snow country for motorized users and nonmotorized users or 2) by providing access to a common starting point for all users and separating the users once they arrive. There is also rising demand for trails dedicated to summer use of ATVs. Roads rated with low value may be converted to trails and meet some of that demand while minimizing costs and adverse resource impacts from new trail construction.

Fuel Reduction: Initiative funding anticipated for the next several years is another opportunity to address growing urban interface wildfire risks. The IDT placed high resource management values on many of the level 3 and 4 roads that provide primary access to areas around and within the Forest with high densities of cabins, homes, and other structures. These roads may be important access routes for fuel reduction projects, especially any commercial projects that could involve log hauling, provide important access for wildfire suppression, and evacuation egress. The IDTs for fuel reduction planning projects can use the road matrix (Appendix B) to begin identifying the existing access/egress situation to help define the road related project proposals.

Deferred Maintenance Backlog: This Manti-La Sal National Forest Roads Analysis clearly demonstrates that annual maintenance funding is inadequate to maintain the road system on the Forest. Over time, these roads will continue to incur additional deferred maintenance costs and degrade unless significant road reconstruction funding becomes available. The agency is addressing this issue nationally by proposing a new funding category for the 2004 federal highway transportation funding authorization called Public Forest Service Roads (PFSR). The road matrix table (Appendix B) displays those roads that are potential PFSRs. The Forest currently has a good working relationship with the counties in regards to shared road maintenance. The Forest should continue to pursue additional formal road maintenance agreements with the counties interested in sharing maintenance to more efficiently use taxpayer funds.

Areas Needing Additional Access

La-Sal Mountains: Two areas, both on the Moab District, were identified as needing improved access (see map below). The first is an area known as the Little Forest and is located in Colorado. Current access to this section is on FSR54101, a maintenance level 1 road that crosses private land. The other area is a small portion surrounded on all sides by private land but connected at one corner to additional Forest Service land.



NEPA Analysis Needs

This forest scale roads analysis will be used as an assessment for the revision of the Manti-La Sal Forest Plan. This roads analysis does not need any NEPA analysis as it provides information and opportunities for the plan revision, as well as for subforest scale roads analyses. Any proposed changes in roads (closures, improvements) will be required to be supported by the appropriate level of NEPA.

Chapter 6 Key Findings

Forest Scale Issues

Road maintenance funding is not adequate to maintain and sign roads to the objective maintenance level.

- The road matrix (Appendix B) developed for this roads analysis contains the annual and deferred maintenance costs for the primary transportation system on the Forest. Even with the focus on the potential minimum road system, our current budget does not cover total road maintenance needs. The Manti-La Sal National Forest currently receives approximately $900,000 per year for road maintenance, while the counties perform approximately $235,000 worth of annual road maintenance work on roads that are covered by Schedule A Forest Road Agreements. The annual cost of maintaining the primary transportation system to objective maintenance levels would cost approximately $1.6 million once all deferred maintenance has been corrected.
- The subforest (project or watershed) level roads analysis process should result in continued reductions of the Forest road maintenance obligations through decommissioning of level 1 and 2 roads. However, these reductions will be minor compared to the overall road maintenance needs on the Forest.

There are potentially adverse environmental impacts from the current classified Forest road system and from user-created roads and trails.

This roads analysis process identified individual roads that represented high potential for environmental risks. Categories 2 and 3 from the Road Risk-Value Graph (page 51) identified approximately 110 miles of these roads.

- Chapter 4 provides more information in response to this issue.

High road densities in some areas of the Forest are causing impacts to resources and users.

- By itself, the maintenance level 3, 4, and 5 road system is not a road density concern.
- Most high road density areas have many unclassified roads and level 1 and 2 roads. At the subforest scale of analysis, these areas would be identified and remedial action recommended. One possible opportunity is the conversion of roads to both motorized and nonmotorized trails.

Right-of-way access across private inholdings is needed.

- In many areas, public access has been successfully acquired through right-of-way acquisition. The jurisdiction column of the road matrix table (Appendix B) displays road segments where the opportunity for additional right-of-way acquisition exists.

The public is concerned about road-related decisions being made without public involvement.

- The public is concerned that decisions about reducing or reconfiguring the Forest's transportation system will be made without the benefit of public involvement. Decisions that will change the existing system will occur through public involvement and a site-specific environmental analysis that considers effects on existing roads or roads proposed for addition, deletion, or reconstruction in the future.

Road access may not be adequate for future management needs.

- Arterial roads are not being maintained to the objective maintenance level specified in the 1986 Forest Plan. This is evident by the operational maintenance level 2 rating of the Ferron-Mayfield road (50022)

- Subforest scale roads analyses should focus on road-related watershed improvement opportunities, decommissioning of unneeded level 1 and 2 roads, and upgrading roads to meet current and future management and public needs.

Forest Supervisor Guidelines Response

The Forest Supervisor requested the following four items be included in the Roads Analysis Report.

1. An inventory and map of the primary transportation system and a description of how those roads are to be managed.

This report includes three types of maps. The map sets are divided into the geographical divisions used for this analysis.

- The first map set displays the existing primary transportation system with the road numbers. It also includes the remaining inventoried roads without their respective road numbers.
- The second map set displays the Potential Minimum Primary Transportation System. These maps display the Road Management Category for all segments of road included in this analysis. The maps, matrix, and graph show management opportunities for the primary transportation system. In subforest scale analysis, specific road management decisions will be made using this information.
- The third map set displays areas of potential instability. These maps should be used for identifying areas of concern for the subforest scale analysis.

2. Guidelines for addressing road management issues and priorities related to construction, reconstruction, maintenance, and decommissioning.

- Chapter 5 of this report contains guidelines and opportunities for addressing road management issues and priorities related to construction, reconstruction, and decommissioning.
- Chapter 5 identifies opportunities for addressing watershed and aquatic resource concerns.

3. Significant social and environmental issues, concerns, and opportunities to be addressed in project level decisions.

- The environmental issues that surfaced are concerns about the health and condition of some watersheds as a result of road impacts, silvicultural concerns about the current and future health of the forest, and road access for fuel reduction projects and fire suppression, especially in the urban interface areas.

Recommendations

- One of the recommendations that was developed at the forest-scale of analysis relates to the objective maintenance levels assigned to the roads included in the study with Forest Service jurisdiction. The area of study established by the IDT was the Forest's primary transportation system. This includes those classified roads that have an objective maintenance level of 3 to 5 and are greater than 0.5 mile in length, and objective maintenance level 2 collector roads. Roads not included in this study will be analyzed at the sub-forest scale (objective maintenance level 1 roads, objective maintenance level 2 local roads, and unclassified roads). Local roads for which the objective maintenance level was recommended for change from 2 to 3 were added to the study. The following table displays those segments of road for which a change in objective maintenance level is being recommended:

Table 6. Objective Maintenance Level Changes

Road Number	Name	Beginning Mile Post	Ending Mile Post	Operational Maintenance Level	Objective Maintenance Level	
					Old	New
50005	Thistle Flat/Petes Hole	0	1.756	2	3	2
50019	Horn Mountain	0	9.31	2	2	3
50037	Straight Fork	0	4.77	2	3	2
50039	New Canyon	1.05	5.46	2	3	2
50043	South Side Ferron	0	17.93	2	3	2
50047	Six Mile	12.05	18.94	2	3	2
50060	East Mountain	0.6	10.64	2	2	3
50072	Lower Two Mile	1.0	1.2	3	2	3
50072	Lower Two Mile	1.2	14.56	2	2	3
50084	Recapture	5.65	13.29	2	2	3
50085	Bulldog-Blue Mountain	0.65	5.92	3	3	2
50086	Blue Mountain Ski Area	0	1.1	3	3	2
50093	Beef Basin	0	2.71	2	2	3
50095	Causeway	11.45	35.45	2	2	3
50101	Chicken Creek	3.95	13.4	2	2	3
50105	Loop Road	0	2.39	2	3	4
50125	Browns Peak	2.1	8.83	2	3	2
50170	North Dragon	2.75	6.9	2	2	3
50178	Deadman Point	0	0.86	2	2	3
50181	Deer Flat	0	0.86	2	2	3
50245	Mill Fork Canyon	0	2.19	3	3	2
50340	Woodenshoe Point	0	0.88	2	2	3

One road in particular that needs further investigation before any change in objective maintenance level can be made is the portion of Skyline Drive (FSR50150) between mileposts 14.5 (Ferron-Mayfield Road) and 58 (State Highway 31). Skyline Drive serves as a portion of the Great Western Trail and is a designated scenic backway. This portion of Skyline Drive currently has an operational maintenance level of 2 (high-clearance vehicles), an objective maintenance level of 3 (low-clearance vehicles), and a functional classification of collector. The existing road template is single lane with a native surface. The native surface makes portions of this road segment extremely slick when wet limiting travel to all vehicles except four-wheel drive vehicles. To further compound the problem, all through roads that leave Skyline Drive within this segment are either high clearance or have portions that are native surface making egress from within this section difficult under wet conditions. The costs associated with upgrading this 44-mile section of road to the objective maintenance level of 3 is not attainable with the current Forest roads budget. It will take forest commodity development/use to warrant and provide the needed financing for improvement. Recreation use alone is not sufficient to warrant making the improvements. If the objective maintenance level of this road were to be changed to 2, any marketing and map display of Skyline Drive would need to communicate the true operational characteristics of this segment to users unfamiliar with the road. Incorporating appropriate signing at the Forest level should be provided.

- Funding for road/water restoration and/or improvement work should be directed toward those roads that fall into road management category 2 (High Value/High Risk) in order to address areas that are creating resource concerns. Deferred maintenance funding should be directed toward those roads in road management categories 1 and 2 (High Value/Low Risk and High Value/High Risk) to accommodate use consistent with objective maintenance levels.
- At the sub-forest scale of analysis, the minimum road system necessary for safe and efficient travel and for administration, utilization, and protection of National Forest System lands needs to be identified per guidance provided in the Code of Federal Regulations Title 36, Part 212, Section 5.

Appendix A

Watershed Risk Assessment and Sensitive Soils Analysis

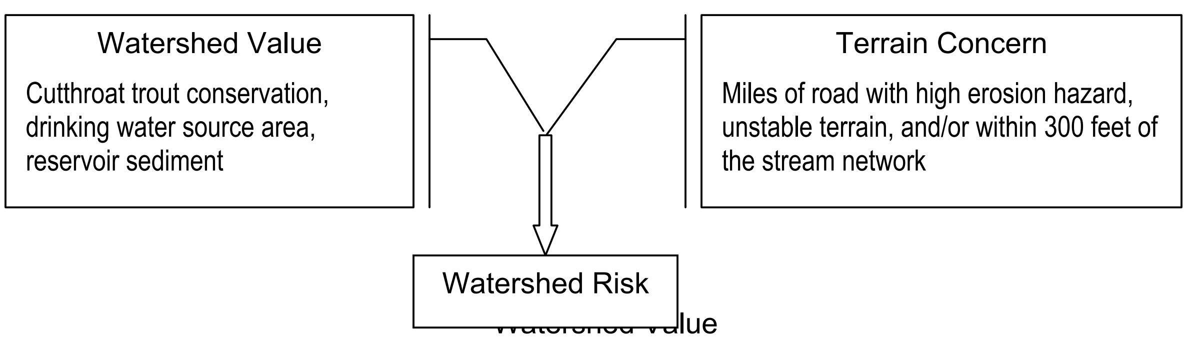
Forest-wide Roads Analysis – Watershed Risk

Developed through GIS analysis of the following information:

- Fifth field (HUC5) watersheds as delineated by USGS (available for entire Forest)
- Soil erosion hazard (available for entire Forest)
- Land stability (specifically mapped for a portion of the Wasatch Plateau and modeled for the remainder of the Forest)
- Stream network as delineated on USGS topographic quadrangles (available for entire Forest)
- Road locations (available for entire Forest)

The erosion hazard and land stability analysis was developed by the GIS section and is documented below. The analysis products were the miles of road crossing areas with high/severe erosion hazard or areas of known or potential instability.

Watershed risk was developed in a series of matrix combinations combining watershed use values, terrain concerns, and road location attributes.



Three uses/values were selected for this analysis: watersheds identified in the conservation strategies for Colorado or Bonneville cutthroat trout, watersheds serving as drinking water source areas for surface systems, and watersheds with reservoirs where sediment from the tributary watershed is a concern. These individual values were combined in two steps to derive watershed value as high/moderate/low. The following tables display the combination matrices.

		Part of Cutthroat Trout Conservation Strategy	
		Yes	No
Surface Drinking Water Source Area	Yes	***A***	***B***
	No	***A***	***C***

		A	B	C
Reservoir-Sediment Concerns	Yes	***High***	***High***	***Moderate***
	No	***High***	***Moderate***	***Low***

Terrain Concerns

The miles of road adjacent to the stream network, crossing areas of unstable terrain, and crossing areas with severe erosion hazard were calculated by road and summarized by HUC5 watershed in spreadsheets and charts. The sum of the miles of road crossing areas of unstable terrain and crossing areas with severe erosion hazard was also calculated and charted for each watershed; this value ranged from 2 – 52 miles. The miles of road within 300 feet of the stream network ranged from less than 1 mile to 49 miles by watershed.

The values for the sum of the miles of road crossing areas of unstable terrain and crossing areas with severe erosion hazard were stratified into three categories: low – less than 10 miles per watershed; moderate – ten to 30 miles; and high – greater than 30 miles per watershed.

The values for the miles of road within 300 feet of the stream network were stratified into three categories: low – less than 5 miles adjacent to the stream network per watershed; moderate –5 to 20 miles; and high – greater than 20 miles per watershed. These values were combined to derive the rating for terrain. The following table displays the combination matrices.

<u>Terrain Concern</u>

		Unstable plus Severe Erosion Hazard (miles)		
		High	Moderate	Low
Within 300' of stream network (miles)	High	***High***	***High***	***Moderate***
	Moderate	***High***	***Moderate***	***Low***
	Low	***Moderate***	***Low***	***Low***

Watershed Risk

The watershed values and terrain concerns were combined to derive watershed risk as high/moderate/low. The following table displays the combination matrices.

Watershed Risk

		Terrain Concerns		
		High	Moderate	Low
Watershed Value	High	***High***	***High***	***Moderate***
	Moderate	***High***	***Moderate***	***Low***
	Low	***Moderate***	***Low***	***Low***

The watershed risk ratings were then used in the road matrix (Appendix B) as one of several factors used to assign roads or road segments in the overall value/risk quadrant system. The risk ratings in this analysis should be used to set priorities for road improvement opportunities that include watershed criteria and for future watershed scale analysis. The risk rating does not represent the true watershed condition; it merely indicates the potential for road-related effects.

Following is the watershed risk, watershed value, and terrain concern assigned to the watersheds (HUC5) used in the analysis.

WS Code	WS Name	WS Risk	WS Value	Terrain Concern
5	Lake/Dairy/Clear	moderate	low	high
7	North Creek	low	moderate	low
9	Greater Muddy	low	low	moderate
14030002040	La Sal Creek	high	high	moderate
14030002050	Paradox Creek	moderate	high	low
14030004010	Geyser/Roc	moderate	high	low
14030004030	Beaver Creek	low	low	low
14030005030	Castle Valley	low	low	low
14030005040	Mill Creek	low	low	moderate
14030005050	Spring/Kane	low	low	low
14030005060	Indian/North Cottonwood	high	high	high
14060007020	Price/Fish/Gooseberry	high	high	high
14060007070	Gordon Creek	low	low	low
14060009010	Huntington	high	high	high
14060009020	Cottonwood/Straight	high	high	high
14060009030	Ferron Creek	high	high	moderate
14070001010	Beef Basin	low	low	low
14070001020	Dark Canyon	low	low	low
14070002010	Muddy Creek	low	low	moderate
14080201050	Recapture Creek	moderate	moderate	moderate
14080201060	Cottonwood Wash	moderate	low	high
16020201010	Salt Creek	low	low	low

WS Code	WS Name	WS Risk	WS Value	Terrain Concern
16020201020	Fourmile	low	low	
16020202020	Thistle Creek	low	low	low
16030003050	Salina Creek	low	low	low
16030004010	East San Pitch	high	high	high
16030004020	West San Pitch	low	low	low
16030004030	Ephraim	low	low	moderate
16030004040	Manti Creek	low	low	low
16030004050	Twelvemile/Sixmile	moderate	low	high
16030005010	Chicken Creek	low	low	low

Erosion and Land Instability Models

Potential for land instability and erosion were modeled using existing data in GIS. The process varied slightly between analysis areas (Sanpitch Division, Manti Division, Moab Ranger District, and Monticello Ranger District.)

Land Instability Analysis - Manti and Sanpitch Divisions

The Manti and Nephi 1:100,000 surface geology data were selected for geologic units known to be potentially unstable. They are the North Horn Formation and areas mapped as mass wasting, existing landslides, and glacial till (often a mantle covering unstable terrain and involved in mass wasting). These data were intersected with slopes of greater than 20% but less than 35% and slopes greater than 35%. Finally classified objective maintenance level 3 and 4 and level 2 collector were intersected with the combined slope and geology data. The term slide is used generically and includes any mass movement affecting roads such as slumps, debris flows, and rockslides.

The resulting layer was symbolized and displayed in GIS by road number and slope. Existing landslide data was added to the display. The data included landslide, mostly derived from the Forest's landslide atlas that was developed during the flood years of 1983 and 1984. Digital orthophotography (DOQ) based on 1997 aerial photography was added to the display. These data have a 1-meter resolution, although in practice they were used at scales of 1:4,000 or broader. Road segments showing potential for land stability based on the slope-geology model and road segments in areas of mapped landslides were reviewed using the digital orthophotography. Any slides apparent on the DOQs were added to the slide layer. Interviews with personnel familiar with problem areas helped clarify concerns. In practice, areas with potential for land instability on slopes greater than 35% correlated well with slide areas. Areas with on slopes between 20 and 35% correlated less frequently with existing slides.

Land Instability Analysis Moab Ranger District

The process was essentially the same as used for the Manti and Sanpitch Divisions except that the Moab and La Sal 1:100,000 geology data were used. Units considered with potential for land instability include: Quarternary mass wasting deposits, Brushy Basin member of the Morrison Formation, Moenkopi Formation, and the Mancos Shale. Little data for existing landslides was available for this area. The process for Moab was more dependent on review of the DOQ and knowledge of the area. In general, land stability potential is lower compared to the Manti Division.

Land Instability Analysis Monticello Ranger District

The process was essential the same as used for the Moab Ranger District except that the 1:500,000 geology layer was used.

Ratings for Engineering Concerns Based on Land Instability

- Road segments with little or no identified potential for land instability; no identified slides were rated low. Some of these segments had a few short (less than .25 mile) sections showing potential for instability on slopes between 20 and 35%, but when viewed using the DOQ showed no indication of instability.
- Road segments with longer sections of potential for land instability but showing little or no actual instability were rated as medium.
- Road segments crossing known slide areas were rated as high.

Erosion Analysis All Areas

The processes for identifying erosion potential was similar to the land stability analysis in that it relied on modeling existing data and reviewing digital orthophotography to validate the model. The Manti Soil Survey (Manti Division), Canyonlands Soil Survey (Moab RD), and Monticello Soil Survey (Monticello RD) were used to identify soil map units containing components with a high or severe erosion hazard potential. The model has not yet been run on the Sanpitch Division. These were intersected with the same slope data as used for land instability potential and with classified roads.

Also available, was a layer showing erosion areas that had previously been identified using Digital orthophotography. The modeled data, existing erosion area layer, and DOQs were displayed and reviewed focusing on road segments showing for erosion hazard. DOQs and the erosion layer were relied on more heavily for the Sanpitch Division in lieu of the soil data.

Ratings for Engineering Concerns Based on Erosion Hazard

- The rating using erosion potential was similar that used for land instability with some differences. Road segments with little or no identified potential for land instability; no identified slides were rated low. Some segments had relatively long sections showing potential for erosion hazard but showed no indication of active erosion when viewed using the DOQ. This indicates that the soil component with high or severe erosion is not in contact with the road. These segments were also rated as low.
- Road segments with high or severe erosion potential and showing and showing some indication of erosion were rated as medium.
- Road segments crossing areas of active erosion areas were rated as high.

Ratings for Engineering Concerns Based on Other Concerns

Ratings based on other concerns also resulted in a medium or high rating.

- Crossing a wetland (high)
- Areas of redundant alignments (medium)
- Extending sections of steep terrain (medium)

Relationship between Watershed Analysis and Land Instability and Erosion Analyses

Additional tables were generated from land instability and erosion analyses to facilitate watershed analysis. These tables identified the road segments with potential for erosion and land instability using the models. Potentials were not separated by slope.

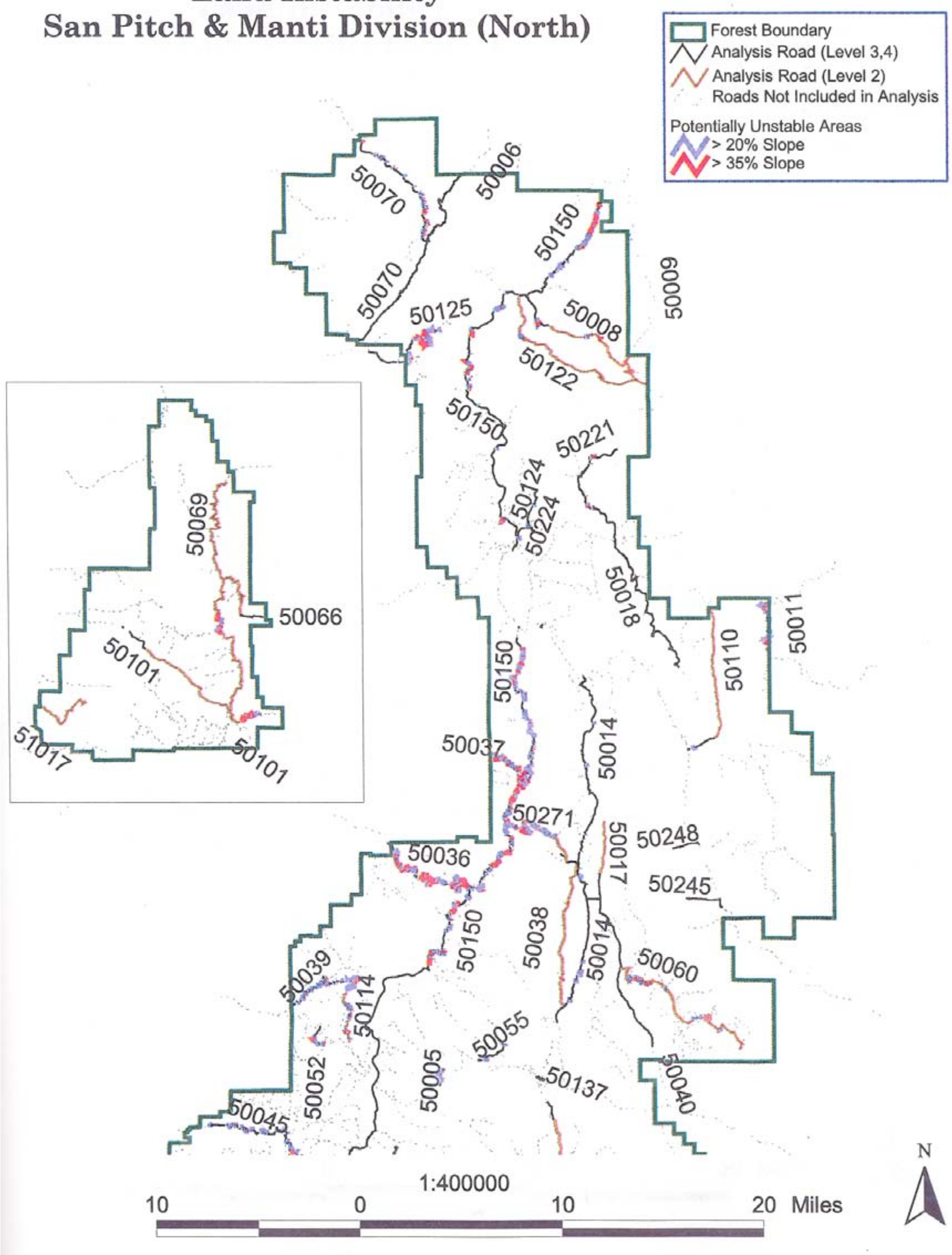
Stream Buffer Analysis

Road segments within 150 feet and 300 feet of existing streams were identified by GIS analyses.

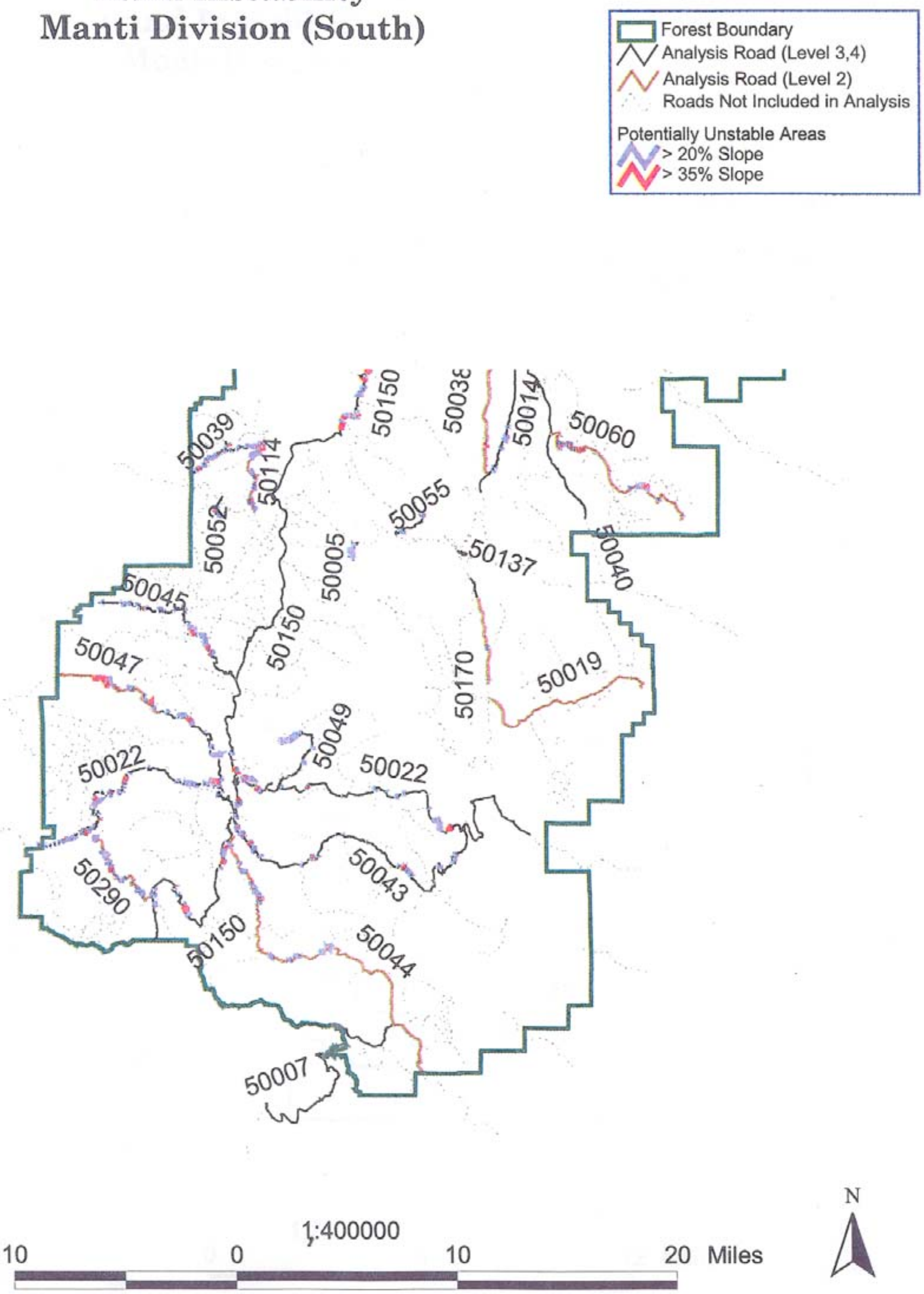
LAND INSTABILITY MAPS

Large maps are available for review
at the Forest Supervisor’s Office and all Ranger District Offices.

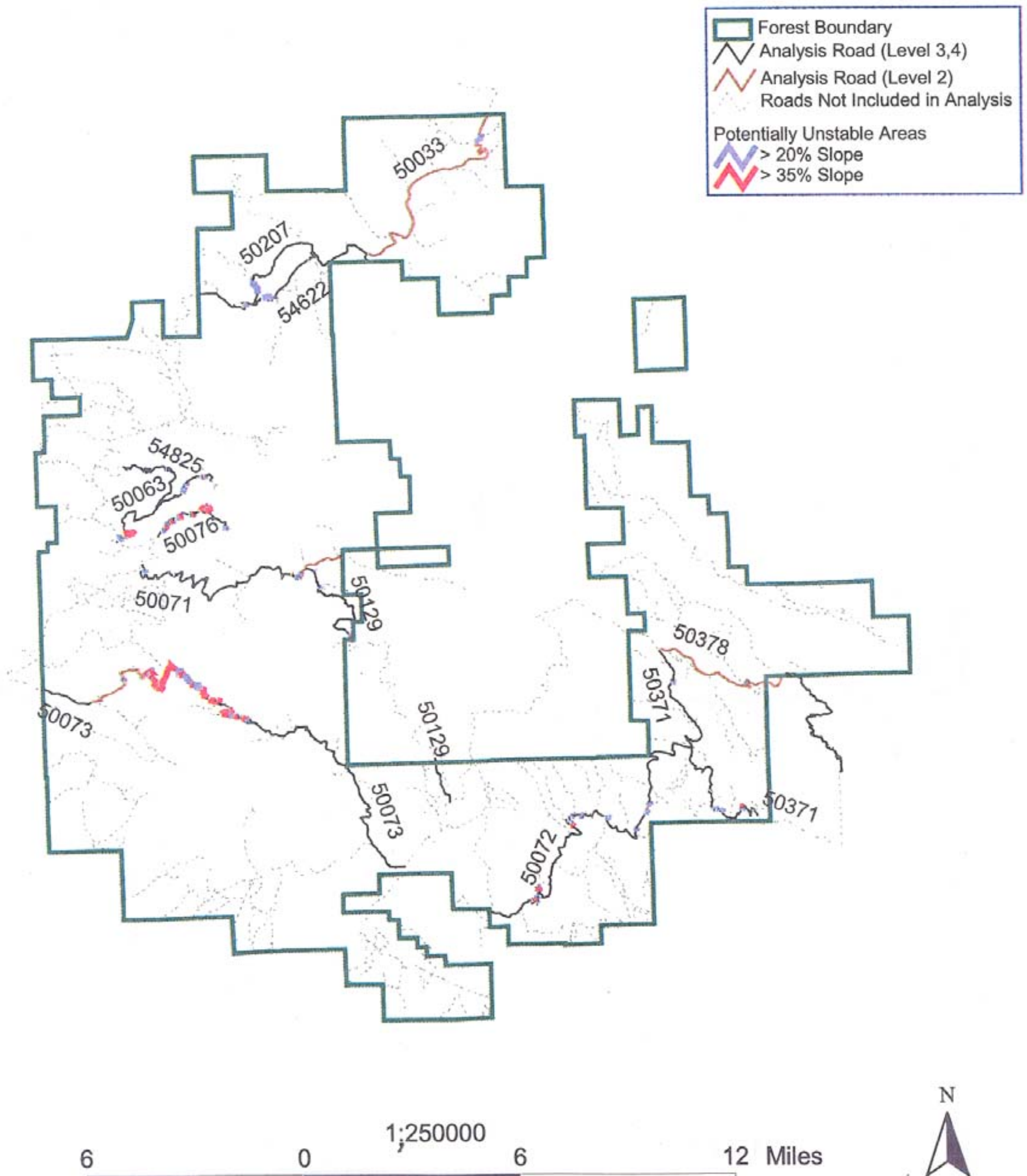
MLNF Roads Analysis
Land Instability
San Pitch & Manti Division (North)



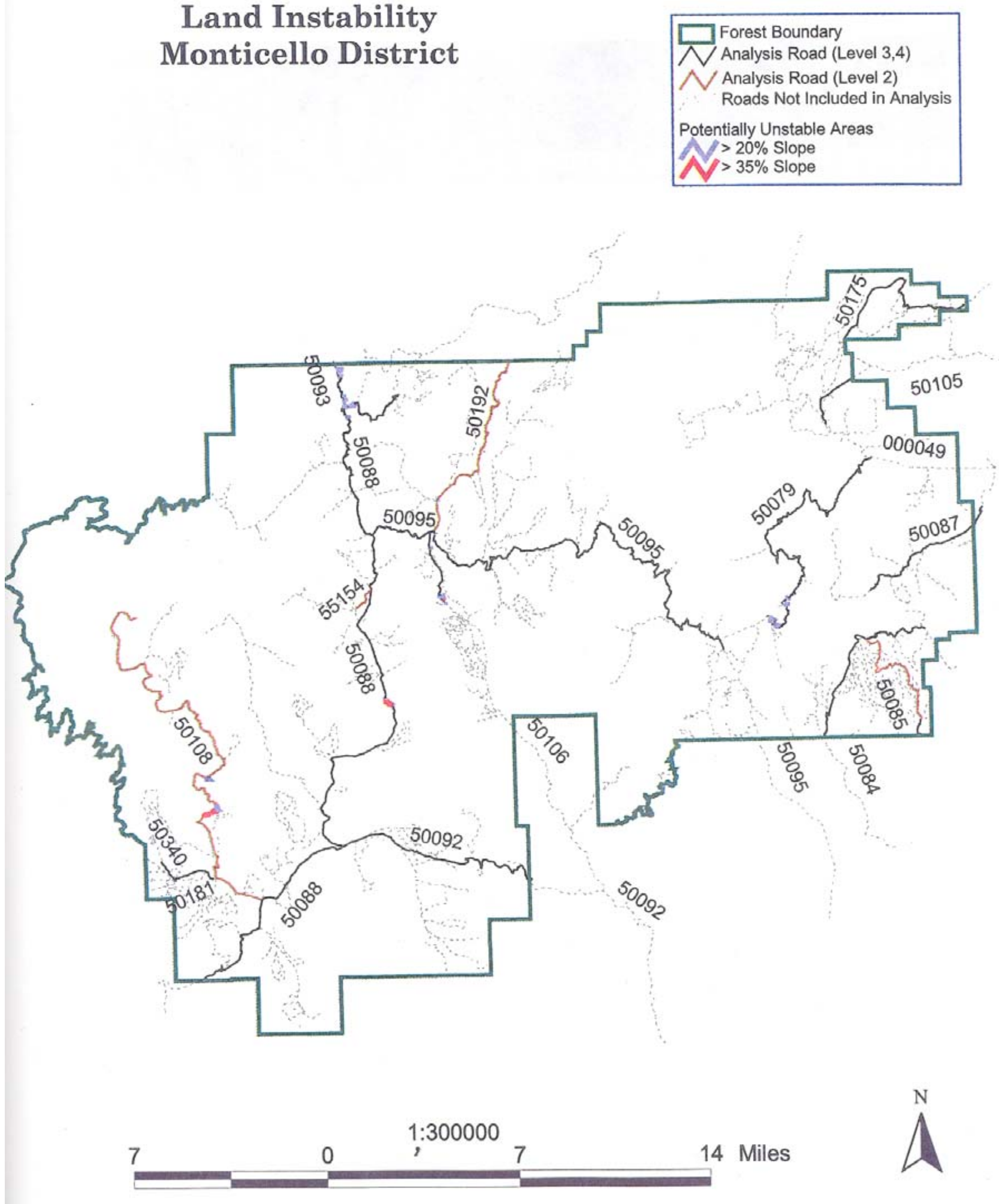
MLNF Roads Analysis
Land Instability
Manti Division (South)



MLNF Roads Analysis
Land Instability
Moab District



MLNF Roads Analysis
Land Instability
Monticello District



Appendix B

Road Matrix

Road Management Categories

Large maps are available for review
at the Forest Supervisor's Office and all Ranger District Offices.

Manti-La Sal NF Forest-Scale Roads Analysis
Road Matrix Table

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50005	THISTLE FLAT/ PETES HOLE	0	1.756	Wasatch Plat.	L	**FS**	2	3	1,167	L	379	L	0	H	M	H	L	P	M		HV	HR	**2**	EC - stability - portion of road length mapped as mass wasting deposit. Steep switchback to Lake.
50006	DAIRY FORK	0	3.029	Wasatch Plat.	C	C																		
		3.029	6.27	Wasatch Plat.	C	**FS**	3	3	4,886	L	16,884	L	0	M	H	M	L	G	M	X	HV	LR	**1**	EC - crosses top of eroded face for approx. half mile
		6.27	8.36	Wasatch Plat.	C	**FS**	2	3	4,886	L	16,884	L	42,000	M	H	M	L	P	L	X	HV	LR	**1**	
50007	QUITCHUPAH	0	2.56	Wasatch Plat.	C	C																		
		2.56	13.12	Wasatch Plat.	C	**FS**	2	3	3,328	L	1,605	L	11,430	M	H	L	L	P	L		HV	LR	**1**	
		13.12	17.32	Wasatch Plat.	C	**FS**	2	3	3,328	L	1,605	L	200,660	M	H	L	L	P	L	X	HV	LR	**1**	
50008	BEAR RIDGE	0	2.25	Wasatch Plat.	C	**FS**	3	3	1,783	L	7,554	L	0	M	H	H	L	G	L	X	HV	LR	**1**	
		2.25	4.5	Wasatch Plat.	C	**FS**	3	2	1,783	L	7,554	L	0	M	H	H	L	G	L	X	HV	LR	**1**	
		4.5	7.28	Wasatch Plat.	C	**FS**	2	2	1,783	L	7,554	L	83,400	M	H	H	L	P	M	X	HV	HR	**2**	EC - slope/geo - apparent small slumps on DOQ
50009	STARVATION SPRING	0	1	Wasatch Plat.	C	C																		
		1	4.305	Wasatch Plat.	C	**FS**	2	2	2,040	L	2,479	L	65,000	M	H	M	L	P	M		HV	LR	**1**	EC - switchbacks on steep slope
		4.305	4.539	Wasatch Plat.	C	C																		
		4.539	4.803	Wasatch Plat.	C	P																		
		4.803	14.54	Wasatch Plat.	C	C																		
50011	BOB WRIGHT CYN-WIREGRASS BENCH	0	16.808	Wasatch Plat.	C	C																		
		16.808	21.174	Wasatch Plat.	C	**FS**	2	2	1,778	L	19,030	L	0	M	H	L	L	P	M		HV	LR	**1**	EC - crosses steep slopes, canyon crossings
		21.174	27.19	Wasatch Plat.	C	C																		
50014	MILLERS FLAT	0	1.1	Wasatch Plat.	C	C																		
		1.1	1.38	Wasatch Plat.	C	**FS**	3	3	3,705	L	9,413	L	0	H	H	H	L	G	L	X	HV	LR	**1**	
		1.38	2.02	Wasatch Plat.	C	**P**	2	3	3,705	L	9,413	L	0	H	H	H	L	P	L	X	HV	LR	**1**	
		2.02	6.07	Wasatch Plat.	C	**FS**	3	3	3,705	L	9,413	L	0	H	H	H	M	G	M	X	HV	LR	**1**	EC - Steep - slippery unless surfaced
		6.07	6.42	Wasatch Plat.	C	**P**	2	3	3,705	L	9,413	L	0	H	H	H	L	P	L	X	HV	LR	**1**	W - Sensitive raptor nesting
		6.42	6.76	Wasatch Plat.	C	**FS**	2	3	3,705	L	9,413	L	0	H	H	H	L	P	L	X	HV	LR	**1**	
		6.76	11.11	Wasatch Plat.	C	**FS**	3	3	3,705	L	9,413	L	0	H	H	H	L	G	L	X	HV	LR	**1**	
		11.11	20.84	Wasatch Plat.	C	**FS**	3	3	3,705	L	9,413	L	0	H	H	H	L	G	L	X	HV	LR	**1**	
50017	SPOON CREEK	0	1.3	Wasatch Plat.	C	**FS**	3	3	1,857	L	2,002	L	49,400	H	M	H	L	G	L		HV	LR	**1**	
		1.3	1.57	Wasatch Plat.	C	**FS**	2	2	1,857	L	2,002	L	10,260	L	M	H	L	G	L		LV	LR	**4**	
		1.57	4.22	Wasatch Plat.	C	**FS**	2	2	1,857	L	2,002	L	0	L	M	H	L	P	H		LV	HR	**3**	EC - rutted - crosses wetland in Upper Joes Valley

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50018	TROUGH SPRINGS	0	5.15	Wasatch Plat.	L	**FS**	3	3	4,280	L	4,820	L	0	M	H	H	L	G	M		HV	LR	**1**	EC -steep side slopes but currently well maintained for oil exploration
		5.15	6	Wasatch Plat.	L	**P**	3	3	4,280	L	4,820	L	0	M	H	H	L	G	M		HV	LR	**1**	EC - steep side slopes but currently well maintained for oil exploration
		6	9.8	Wasatch Plat.	L	**FS**	3	3	4,280	L	4,820	L	0	M	H	H	L	P	M		HV	HR	**2**	EC - steep side slopes but currently well maintained for oil exploration
50019	HORN MOUNTAIN	0	6.74	Wasatch Plat.	C	**FS**	2	2	475	L	2,582	L	0	M	H	H	L	P	L		HV	LR	**1**	
		6.74	6.89	Wasatch Plat.	C	**P**	2	2	475	L	2,582	L	0	M	H	H	L	P	L		HV	LR	**1**	
		6.89	9.31	Wasatch Plat.	C	**FS**	2	2	475	L	2,582	L	0	M	H	H	L	P	L		HV	LR	**1**	
50022	FERRON - MAYFIELD	0	2.43	Wasatch Plat.	A	C																		
		2.43	20.18	Wasatch Plat.	A	**FS**	3	3	3,517	L	12,271	L	0	H	H	M	L	G	H	X	HV	LR	**1**	EC - road had to be realigned due to 12 mile Slide. Current align in landslide terrain active during 1983-84, especially along Twelve Mile Creek below Twin Lake
		20.18	36.64	Wasatch Plat.	A	**FS**	2	3	3,517	L	12,271	L	706,400	H	H	H	L	G	H	X	HV	LR	**1**	EC - steep side slope; hummocky terrain; slides in summit area
		36.64	41.264	Wasatch Plat.	A	**FS**	2	3	3,517	L	12,271	L	242,850	H	H	H	L	G	M	X	HV	LR	**1**	EC - steep slopes
		41.264	43.174	Wasatch Plat.	A	C																		EC - steep side slopes
		43.174	47.77	Wasatch Plat.	A	S																		
50025	FERRON RES. C.G.	0	0.53	Wasatch Plat.	L	**FS**	2	3	5,623	M	0	L	0	H	M	H	L	M	M		HV	LR	1	
50033	POLAR MESA	0	0.2	Moab	C	**FS**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		0.2	0.4	Moab	C	**P**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		0.4	6.15	Moab	C	**FS**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.15	6.2	Moab	C	**P**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.2	6.25	Moab	C	**FS**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.25	6.45	Moab	C	**P**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.45	6.55	Moab	C	**FS**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.55	6.65	Moab	C	**P**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		6.65	7.8	Moab	C	**FS**	2	2	1,656	L	1,252	L	0	M	H	L	L	P	L		HV	LR	**1**	
		7.8	9.76	Moab	C	C																		
50036	SPRING CITY-BLACK CANYON	0	3.25	Wasatch Plat.	C	C																		
		3.25	6.6	Wasatch Plat.	C	**FS**	3	3	1,874	L	8,927	L	0	H	H	H	L	G	M	X	HV	LR	**1**	EC - crosses mapped slide about .8 miles east of Forest Boundary
		6.6	11.9	Wasatch Plat.	C	**FS**	2	3	1,874	L	8,927	L	0	H	H	H	L	P	L	X	HV	LR	**1**	
		11.9	12.3	Wasatch Plat.	L	**FS**	2	3	1,874	L	8,927	L	0	H	H	H	L	P	L	X	HV	LR	**1**	Gen comment - should be Sanpete not Ferron

Manti-La Sal NF Forest-Scale Roads Analysis
Road Matrix Table

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50037	STRAIGHT FORK	0	4.77	Wasatch Plat.	C	FS	2	3	1,756	L	7,289	L	190,800	M	H	L	L	P	M	X	HV	LR	1	EC - continually steep terrain in first mile east of Forest boundary
50038	LOWRY WATER	0	0.2	Wasatch Plat.	C	FS	2	2	856	L	2,451	L	0	M	H	H	L	G	L		HV	LR	1	
		0.2	0.25	Wasatch Plat.	C	P	2	2	856	L	2,451	L	0	M	H	H	L	G	L		HV	LR	1	
		0.25	0.5	Wasatch Plat.	C	FS	2	2	856	L	2,451	L	0	M	H	H	L	G	L		HV	LR	1	
		0.5	2.84	Wasatch Plat.	C	FS	2	2	856	L	2,451	L	0	M	H	H	L	G	L		HV	LR	1	
		2.84	4.98	Wasatch Plat.	C	FS	2	2	856	L	2,451	L	0	L	H	H	L	G	L		HV	LR	1	
		4.98	8.108	Wasatch Plat.	C	FS	2	2	856	L	2,451	L	338,100	L	H	H	L	P	L		LV	LR	4	
50039	NEW CANYON	0	1.05	Wasatch Plat.	C	C																		EC - small slides along road
		1.05	5.46	Wasatch Plat.	C	FS	2	3	1,789	L	1,145	L	0	M	H	H	L	P	H		HV	HR	2	EC - runs at base of slide terrain primarily on to north side
50040	COTTONWOOD	0	3.12	Wasatch Plat.	C	C																		
		3.12	7.52	Wasatch Plat.	C	FS	3	3	12,784	H	4,318	L	15,960	H	H	H	L	G	L	X	HV	LR	1	AM - Dust abated
		7.52	8.06	Wasatch Plat.	C	S	3	3	12,784	H	4,318	L	0	H	H	H	L	G	L	X	HV	LR	1	
		8.06	9.95	Wasatch Plat.	C	FS	3	3	12,784	H	4,318	L	0	H	H	H	L	G	L	X	HV	LR	1	
		9.95	10.97	Wasatch Plat.	C	FS	2	3	12,784	H	4,318	L	0	H	H	H	L	P	L	X	HV	HR	2	
		10.97	11.19	Wasatch Plat.	C	P	2	3	12,784	H	4,318	L	0	H	H	H	L	P	L	X	HV	HR	2	
		11.19	11.69	Wasatch Plat.	C	FS	2	3	12,784	H	4,318	L	0	H	H	H	L	P	L	X	HV	HR	2	
		11.69	12.34	Wasatch Plat.	C	FS	3	3	12,784	H	4,318	L	0	H	H	H	L	G	L	X	HV	LR	1	
50043	SOUTH SIDE FERRON	0	17.93	Wasatch Plat.	C	FS	2	3	3,180	L	2,422	L	0	M	H	L	L	P	H		HV	LR	1	EC - crosses active slide terrain above Muddy Creek
50044	LINK CANYON	0	5.8	Wasatch Plat.	C	C																		
		5.8	9.31	Wasatch Plat.	C	FS	2	2	1,118	L	3,637	L	64,000	M	H	L	L	P	H		HV	LR	1	EC - very steep grades in Link Canyon; upper section crosses terrain with slide potential
		9.31	26.65	Wasatch Plat.	C	FS	2	2	1,118	L	3,637	L	64,000	M	H	L	L	P	H		HV	LR	1	EC - very steep grades in Link Canyon; upper section crosses terrain with slide potential
50045	MANTI CANYON	0	1.6	Wasatch Plat.	C	C																		
		1.6	2.25	Wasatch Plat.	C	FS	3	3	2,909	L	20,412	L	0	H	H	L	L	G	M	X	HV	LR	1	EC - crosses terrain with slide potential
		2.25	2.3	Wasatch Plat.	C	C	3	3	2,909	L	20,412	L	0	H	H	L	L	G	M	X	HV	LR	1	EC - crosses terrain with slide potential
		2.3	7.25	Wasatch Plat.	C	FS	3	3	2,909	L	20,412	L	45,860	H	H	L	L	G	M	X	HV	LR	1	EC - crosses terrain with slide potential
		7.25	12.59	Wasatch Plat.	C	FS	2	3	2,909	L	20,412	L	147,310	H	H	L	L	F	M	X	HV	LR	1	EC - crosses terrain with slide potential

Manti-La Sal NF Forest-Scale Roads Analysis
Road Matrix Table

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50047	SIX MILE	0	1.45	Wasatch Plat.	C	S																		
		1.45	3.75	Wasatch Plat.	C	C																		
		3.75	12.05	Wasatch Plat.	C	**FS**	2	2	4,249	L	7,216	L	241,187	M	H	M	L	P	H		HV	HR	**2**	EC - road in landslide environment in canyon
		12.05	18.94	Wasatch Plat.	C	**FS**	2	3	4,249	L	7,216	L	200,214	M	H	M	L	P	M		HV	LR	**1**	EC - crosses terrain with slide potential
50049	DUCK FORK	0	5.1	Wasatch Plat.	L	**FS**	3	3	1,749	L	570	L	0	H	M	H	L	G	L		HV	LR	**1**	
50052	LAKE HILL C.G.	0	0.4	Wasatch Plat.	L	**FS**	3	3	2,661	L	9,627	L	0	H	M	H	M	G	L	L	HV	LR	**1**	
		0.4	1.59	Wasatch Plat.	L	**FS**	3	3	2,661	L	9,627	L	5,000	H	M	H	M	P	L	H	HV	HR	**2**	EC - Crosses area of high potential for instability. Slide terrain seen on DOQ at approximate mile post 1.
50055	LITTLES CANYON	0	2.1	Wasatch Plat.	L	**FS**	3	3	2,174	L	3,941	L	0	H	M	H	L	P	M		HV	HR	**2**	EC - slides south of Lake
50060	EAST MOUNTAIN	0	0.6	Wasatch Plat.	C	**S**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		0.6	1.5	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		1.5	2.1	Wasatch Plat.	C	**S**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		2.1	4.5	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		4.5	5.7	Wasatch Plat.	C	**P**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		5.7	6.25	Wasatch Plat.	C	**P**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		6.25	6.95	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		6.95	7.15	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		7.15	7.55	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	5,040	L	H	H	L	P	L		HV	LR	**1**	
		7.55	7.9	Wasatch Plat.	C	**P**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		7.9	8.85	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		8.85	9.25	Wasatch Plat.	C	**P**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
		9.25	10.64	Wasatch Plat.	C	**FS**	2	2	850	L	898	L	0	L	H	H	L	P	L		HV	LR	**1**	
50063	WARNER GUARD STATION	0	5.1	Moab	L	**FS**	3	3	4,869	L	13,656	L	166,946	H	H	L	L	G	M		HV	LR	**1**	
50066	MAPLE CANYON	0	1.3	San Pitch	C	**FS**	3	3	2,484	L	2,470	L	0	H	H	L	L	G	L	X	HV	LR	**1**	
		1.3	4.63	San Pitch	C	**FS**	2	2	2,484	L	2,470	L	93,900	H	H	L	L	P	M		HV	LR	**1**	EC - road, rough
50069	LOG CANYON - MARBLE HILL	0	17.6	San Pitch	C	**FS**	2	2	1,244	L	4,692	L	449,150	M	H	L	L	P	M		HV	LR	**1**	EC - crosses terrain with slide potential
		17.6	21.6	San Pitch	C	C																		
50070	LAKE FORK - INDIANOLA	0	1.8	Wasatch Plat.	C	C																		
		1.8	5.3	Wasatch Plat.	C	**FS**	3	3	2,833	L	9,280	L	30,030	M	H	L	L	G	L	X	HV	LR	**1**	
		5.3	8.55	Wasatch Plat.	C	**FS**	3	3	2,833	L	9,280	L	127,140	M	H	L	L	G	M	X	HV	LR	**1**	EC - crosses terrain with slide potential
		8.55	16.35	Wasatch Plat.	C	**FS**	2	3	2,833	L	9,280	L	337,260	M	H	L	L	P	M	X	HV	LR	**1**	EC - crosses terrain with slide potential
		16.35	19.24	Wasatch Plat.	C	C																		

Manti-La Sal NF Forest-Scale Roads Analysis
Road Matrix Table

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50071	GEYSER PASS	0	7.65	Moab	C	FS	3	3	4,675	L	7,884	L	0	H	H	M	L	G	L	X	HV	LR	1	
		7.65	9.12	Moab	C	FS	2	2	4,675	L	7,884	L	0	H	H	M	L	P	M		HV	LR	1	EC - many parallel roads/mining roads
		9.12	13.15	Moab	C	C																		
50072	LOWER TWO MILE	0	0.85	Moab	C	C																		
		0.85	1	Moab	C	P																		
		1	1.2	Moab	C	FS	3	3	1,600	L	3,062	L	0	H	H	H	L	G	L		HV	LR	1	
		1.2	6.35	Moab	C	FS	2	3	1,600	L	3,062	L	0	H	H	H	L	P	M		HV	HR	2	EC - many canyon crossings
		6.35	6.65	Moab	C	P	2	3	1,600	L	3,062	L	0	H	H	H	L	P	M		HV	HR	2	EC - many canyon crossings
		6.65	14.56	Moab	C	FS	2	3	1,600	L	3,062	L	0	H	H	H	L	P	M		HV	HR	2	EC - many canyon crossings
50073	PACK CREEK - LASAL PASS	0	1.2	Moab	C	C																		
		1.2	2.05	Moab	C	P	3	3						H	H	L	L	G	L					
		2.05	2.34	Moab	C	FS	2	3	1,983	L	8,218	L	0	H	H	L	L	G	L	X	HV	LR	1	
		2.34	2.7	Moab	C	FS	2	3	1,983	L	8,218	L	840	H	H	L	L	G	L	X	HV	LR	1	
		2.7	11.5	Moab	C	FS	2	2	1,983	L	8,218	L	8,400	M	H	L	L	P	M	X	HV	LR	1	EC - many parallel roads/mining roads; alignment not accurate in classified roads layer
		11.5	17.6	Moab	C	FS	3	3	1,983	L	8,218	L	0	M	H	H	L	G	M	X	HV	LR	1	EC - many parallel roads/mining roads; alignment not accurate in classified roads layer
		17.6	18.62	Moab	C	P	3	3	1,983	L	8,218	L	0	M	H	H	L	G	L	X	HV	LR	1	
50076	OOWAH LAKE	0	3.01	Moab	L	FS	3	3	4,207	L	10,023	L	129,780	H	M	L	L	G	L		HV	LR	1	
		3.01	3.21	Moab	L	FS	3	3	4,207	L	10,023	L	0	H	M	L	L	G	L		HV	LR	1	
50079	INDIAN CREEK	0	2.05	Monticello	C	C																		
		2.05	17.8	Monticello	C	FS	2	3	907	L	5,098	L	0	H	H	L	L	P	M		HV	LR	1	EC - Steep switchbacks cross terrain with slide potential. Landslide at mp 6.75 as per DOQ
50084	RECAPTURE	0	5.65	Monticello	L	C																		
		5.65	13.29	Monticello	L	FS	2	3	843	L	680	L	0	M	H	M	L	P	M		HV	LR	1	EC - Crosses disturbed area. Indications of erosion by DOQ
50085	BULLDOG - BLUE MOUNTAIN	0	0.65	Monticello	L	FS	3	3	1,949	L	46,463	M	0	H	M	M	L	G	L		HV	LR	1	Gen comment - This is a class 3 road that runs through a dense network of class 2 roads.
		0.65	0.72	Monticello	L	FS	3	2	1,949	L	46,463	M	0	M	M	M	L	G	L		LV	LR	4	Gen comment - This is a class 3 road that runs through a dense network of class 2 roads.
		0.72	0.81	Monticello	L	P	3	2	1,949	L	46,463	M	0	M	M	M	L	G	L		LV	LR	4	Gen comment - This is a class 3 road that runs through a dense network of class 2 roads.

Manti-La Sal NF Forest-Scale Roads Analysis
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Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50085	BULLDOG - BLUE MOUNTAIN cont.	0.81	0.97	Monticello	L	FS	3	2	1,949	L	46,463	M	0	M	M	M	L	G	L		LV	LR	4	Gen comment - This is a class 3 road that runs through a dense network of class 2 roads.
		0.97	5.92	Monticello	L	FS	2	2	1,949	L	46,463	M	0	M	M	M	L	P	L		LV	LR	4	Gen comment - This is a class 3 road that runs through a dense network of class 2 roads.
50087	SOUTH CREEK	0	2.6	Monticello	L	C																		
		2.6	8.6	Monticello	L	FS	2	3	1,060	L	9,020	L	0	M	H	L	L	P	M		HV	LR	1	
50088	ELK RIDGE	0	3.1	Monticello	C	C																		EC - Steep dugway with apparent erosion downslope from road.
		3.1	35.95	Monticello	C	FS	2	3	1,417	L	3,351	L	45,150	H	H	L	L	P	H	X	HV	LR	1	EC - wet and slumpy area in Moenkopi at the "Notch"; steep terrain and indications of sliding North side of Horse Mtn as per DOQ.
		35.95	57.56	Monticello	C	C																		
50092	SOUTH ELKS	0	11.083	Monticello	C	C																		
		11.083	14.65	Monticello	C	FS	3	3	4,988	L	4,023	L	0	H	H	M	L	G	L	X	HV	LR	1	
		14.65	16.81	Monticello	C	FS	2	3	4,988	L	4,023	L	0	H	H	M	L	G	L	X	HV	LR	1	
		16.81	19.73	Monticello	C	FS	2	3	4,988	L	4,023	L	110,960	H	H	M	L	P	L	X	HV	LR	1	
50093	BEEF BASIN	0	2.71	Monticello	L	FS	2	3	1,140	L	2,987	L	0	M	M	L	L	P	M		HV	LR	1	EC - Crosses very steep terrain at approximate Mile Post 0.9. Highly disturbed area with erosion on switchback at mile post 1.7.
50095	CAUSEWAY	0	11.45	Monticello	C	C																		
		11.45	35.45	Monticello	C	FS	2	3	1,050	L	9,706	L	102,480	H	H	M	H	P	M		HV	HR	2	EC - steep side slopes; rock slide below road at south side of Round Mtn. and above Cottonwood Wash below Mormon Pasture; steep rocky side slopes along "The Causeway"; rock slides locally below road along the "The Causeway" W- Sensitive plant Concerns
50101	CHICKEN CREEK	0	3.5	San Pitch	C	C																		
		3.5	3.6	San Pitch	C	FS	3	3	2,286	L	4,656	L	0	M	H	L	L	G	L	X	HV	LR	1	
		3.6	3.95	San Pitch	C	C																		
		3.95	5.35	San Pitch	C	FS	3	3	2,286	L	4,656	L	0	M	H	L	L	G	L	X	HV	LR	1	
		5.35	13	San Pitch	C	FS	2	2	2,286	L	4,656	L	0	M	H	L	L	P	M	X	HV	LR	1	EC - crosses terrain with slide potential
		13	13.4	San Pitch	C	P	2	2	2,286	L	4,656	L	0	M	H	L	L	P	L		HV	LR	1	

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50105	LOOP ROAD	0	2.39	Monticello	C	FS	2	4	4,624	L	12,283	L	0	M	H	L	L	G	L	X	HV	LR	1	
		2.39	14	Monticello	C	C																		EC - many parallel roads; mining district?
50106	SOUTH COTTONWOOD	0	7.65	Monticello	C	C																		
		7.65	8	Monticello	C	P																		
		8	14.35	Monticello	C	C																		
		14.35	17.65	Monticello	C	FS	2	3	592	L	4,644	L	90,420	H	H	M	L	P	M	X	HV	LR	1	EC - Steep switchback with apparent erosion at mp 14.35. Potential foradditional erosion and slope instability in same area. Area disturbed by mining activity.
50108	DRY MESA	0	20.69	Monticello	L	FS	2	2	1,372	L	1,051	L	0	H	H		L	P	M		HV	LR	1	EC - Severe erosion hazaard as per soil survey and instability from mp 2.75-3.75. Slides cross road at mp 3.75. As per DOQ
50110	NUCK WOODWARD	0	1.55	Wasatch Plat.	C	FS	3	3	2,071	L	1,039	L	0	H	H	H	L	G	L		HV	LR	1	
		1.55	8.3	Wasatch Plat.	C	FS	2	2	2,071	L	1,039	L	0	H	H	H	L	P	H		HV	HR	2	EC - steep, rocky; high clearance needed; uneven surface along stream in upper part of this section
		8.3	10.76	Wasatch Plat.	C	C																		
50114	WHITE LEDGE - HELL HOLE	0	3.79	Wasatch Plat.	C	FS	2	2	485	L	2,600	L	0	M	H	L	L	P	H		HV	LR	1	EC - crosses land slides; parallel alignments on north end.
50122	FISH CREEK RIDGE	0	9.97	Wasatch Plat.	C	FS	2	2	1,666	L	426	L	333,800	H	H	H	L	P	L		HV	LR	1	
50124	GOOSEBERRY RSVR	0	1.65	Wasatch Plat.	L	FS	3	3	4,214	L	1,920	L	0	H	H	H	L	G	L		HV	LR	1	
		1.65	1.8	Wasatch Plat.	L	P	3	3	4,214	L	1,920	L	0	H	H	H	L	G	L		HV	LR	1	
		1.8	3.06	Wasatch Plat.	L	FS	3	3	4,214	L	1,920	L	0	H	H	H	L	G	L		HV	LR	1	
50125	BROWNS PEAK	0	2.1	Wasatch Plat.	C	C																		
		2.1	8.83	Wasatch Plat.	C	FS	2	3	2,293	L	8	L	0	H	H	L	L	P	M		HV	LR	1	EC - steep terrain with landslide potential
50129	DARK CANYON LAKE	0	3.85	Moab	C	FS	2	3	2,141	L	3,351	L	38,317	H	H	H	L	P	L	X	HV	LR	1	
		3.85	11.4	Moab	C	C																		
		11.4	12.82	Moab	C	FS	3	3	2,141	L	3,351	L	0	H	H	H	L	G	L	X	HV	LR	1	
50137	JOES VALLY C.G.	0	1.12	Wasatch Plat.	L	FS	4	4	2,918	L	35,148	M	0	H	M	H	L	G	L		HV	LR	1	

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50150	SKYLINE DRIVE SOUTH	0	8.1	Wasatch Plat.	C	**FS**	3	3	3,429	L	13,048	L	341,842	H	H	M	M	F	M	X	HV	LR	**1**	EC - Hummocky Terrain (slump potential) W-Sensitive plant concerns at Baseball Flat
		8.1	12.3	Wasatch Plat.	C	**FS**	3	3	3,429	L	13,048	L	179,362	H	H	H	H	F	L	X	HV	HR	**2**	W - Sensitive plant concerns on High Top
		12.3	12.35	Wasatch Plat.	C	**FS**	3	3	3,429	L	13,048	L	5,330	H	H	M	L	G	L	X	HV	LR	**1**	
		12.35	12.5	Wasatch Plat.	A	**FS**	3	3	3,429	L	13,048	L	1,000	H	H	M	L	G	L	X	HV	LR	**1**	
		12.5	13.65	Wasatch Plat.	A	**FS**	3	3	3,429	L	13,048	L	48,533	H	H	M	L	G	L	X	HV	LR	**1**	
		13.65	14.5	Wasatch Plat.	C	**FS**	2	3	3,429	L	13,048	L	35,872	H	H	H	L	G	M	X	HV	LR	**1**	EC - landslide below switchback (Ferron Mayfield Rd)
	SKYLINE DRIVE CENTRAL	14.5	24.25	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	619,520	H	H	L	L	P	L	X	HV	LR	**1**	
		24.25	25.05	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	51,200	H	H	H	L	P	L	X	HV	LR	**1**	
		25.05	33.05	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	376,340	H	H	L	L	P	L	X	HV	LR	**1**	
		33.05	38.9	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	175,500	H	H	H	L	P	L	X	HV	LR	**1**	
		38.9	41.2	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	69,000	H	H	L	L	P	H	X	HV	LR	**1**	EC - landslides, erosion, rutting
		41.2	42.9	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	90,780	H	H	H	L	P	H	X	HV	HR	**2**	EC - landslides, erosion, rutting
		42.9	46.1	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	220,543	H	H	H	L	P	H	X	HV	HR	**2**	EC - landslides, erosion, rutting
		46.1	46.55	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	31,014	H	H	H	L	P	H	X	HV	HR	**2**	EC - landslides, erosion, rutting
		46.55	52.65	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	420,411	H	H	L	L	P	H	X	HV	LR	**1**	EC - landslides, erosion, rutting
		52.65	53	Wasatch Plat.	C	**P**	2	3	1,349	L	6,613	L	24,122	H	H	L	L	P	M		HV	LR	**1**	EC - small slides, seasonally rutted
		53	58	Wasatch Plat.	C	**FS**	2	3	1,349	L	6,613	L	352,870	H	H	L	L	P	M	X	HV	LR	**1**	EC - small slides, seasonally rutted
	SKYLINE DRIVE STATE SECTION	58	63.15	Wasatch Plat.	A	S																		
	SKYLINE DRIVE NORTH	63.15	66.6	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L	X	HV	LR	**1**	
		66.6	66.65	Wasatch Plat.	C	**P**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L		HV	LR	**1**	
		66.65	67	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L	X	HV	LR	**1**	
		67	67.9	Wasatch Plat.	C	**P**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L		HV	LR	**1**	
		67.9	68.9	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L	X	HV	LR	**1**	
		68.9	69.05	Wasatch Plat.	C	**P**	3	3	3,873	L	32,997	M	0	H	H	H	L	G	L		HV	LR	**1**	
		69.05	75.8	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	167,400	H	H	H	L	G	L	X	HV	LR	**1**	
		75.8	76.1	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	9,000	H	H	H	L	G	L	X	HV	LR	**1**	
		76.1	76.6	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	15,000	H	H	H	L	G	L	X	HV	LR	**1**	
		76.6	87.85	Wasatch Plat.	C	**FS**	3	3	3,873	L	32,997	M	536,080	H	H	H	M	G	M	X	HV	HR	**2**	EC - steep grades W - Sensitive raptor nest

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50170	NORTH DRAGON	0	1.75	Wasatch Plat.	C	C																		
		1.75	2.75	Wasatch Plat.	C	**FS**	3	3	1,402	L	6,495	L	0	M	H	H	L	G	L		HV	LR	**1**	
		2.75	6.9	Wasatch Plat.	C	**FS**	3	3	1,402	L	6,495	L	99,360	M	H	H	L	P	M		HV	HR	**2**	EC - maze of widely spaced erosion control structures/roads
50175	PETERS POINT	0	0.85	Monticello	L	C																		
		0.85	0.95	Monticello	L	**FS**	2	3	2,224	L	2,108	L	0	M	M	L	L	P	L		LV	LR	**4**	
		0.95	1.3	Monticello	L	C																		
		1.3	1.4	Monticello	L	**FS**	2	3	2,224	L	2,108	L	0	M	M	L	L	P	L		LV	LR	**4**	
		1.4	1.45	Monticello	L	C																		
		1.45	8.22	Monticello	L	**FS**	2	3	2,224	L	2,108	L	0	M	M	L	L	P	L		LV	LR	**4**	
		8.22	8.8	Monticello	L	**FS**	2	3	2,224	L	2,108	L	0	M	M	L	L	G	L		LV	LR	**4**	
		8.8	10.097	Monticello	L	C	2																	
50181	DEER FLAT	0	1.72	Monticello	L	**FS**	2	3	750	L	5,638	L	0	M	M	L	L	P	L		HV	LR	**1**	
50192	STEVENS CANYON	0	8.976	Monticello	C	**FS**	2	2	784	L	1,158	L	0	H	H	H	L	P	L		HV	LR	**1**	
50207	GATEWAY	0	0.4	Moab	C	C																		
		0.4	0.9	Moab	C	**FS**	4	4	2,215	L	214	L	0	M	H	L	L	G	L	X	HV	LR	**1**	
		0.9	1.25	Moab	C	**P**	4	4	2,215	L	214	L	0	M	H	L	L	G	L		HV	LR	**1**	
		1.25	1.59	Moab	C	**FS**	4	4	2,215	L	214	L	0	M	H	L	L	G	L	X	HV	LR	**1**	
		1.59	2.3	Moab	C	**P**	4	4	2,215	L	214	L	0	M	H	L	L	G	L		HV	LR	**1**	
		2.3	5.19	Moab	C	**FS**	4	4	2,215	L	214	L	0	M	H	L	L	G	M	X	HV	LR	**1**	EC - crosses steep slopes with slide potential; parallel alignments
		5.19	5.63	Moab	C	**FS**	3	3	2,215	L	214	L	0	M	H	L	L	G	L	X	HV	LR	**1**	
		5.63	7.97	Moab	C	**FS**	3	3	2,215	L	214	L	0	M	H	L	L	G	L	X	HV	LR	**1**	
50208	UPPER TWO MILE	0	17.59	Moab	C	C																		
		17.59	17.73	Moab	C	P																		
		17.73	18.23	Moab	C	C																		
50221	GRANGER RIDGE	0	7.38	Wasatch Plat.	L	**FS**	3	3	4,343	L	5,483	L	0	M	H	H	L	G	M		HV	LR	**1**	EC - parallel alignments
50224	GOOSEBERRY C.G.	0	0.72	Wasatch Plat.	L	**FS**	3	3	2,120	L	18,400	L	0	H	M	H	L	P	M		HV	HR	**2**	EC - Crosses terrain w/moderate poential for instability.
50245	MILL FORK CANYON	0	2.19	Wasatch Plat.	L	**FS**	3	3	4,381	L	27,872	M	0	L	M	H	L	G	M		LV	LR	**4**	EC - maze of parallel roads
50246	RILDA CANYON	0	2.65	Wasatch Plat.	L	C																		
50248	CRANDALL CANYON	0	1.2	Wasatch Plat.	L	**FS**	3	3	3,343	L	2,238	L	0	M	H	H	L	G	L		HV	LR	**1**	
		1.2	1.43	Wasatch Plat.	L	**P**	3	3	3,343	L	2,238	L	0	M	H	H	L	G	L		HV	LR	**1**	
50262	UN-NAMED (SILVER SHADOWS)	0	5.08	San Pitch	L	C																		
50271	POTTERS CANYON	0	5.5	Wasatch Plat.	C	**FS**	2	2	1,223	L	3,482	L	0	H	H	H	L	P	M	X	HV	HR	**2**	EC - steep side slopes ; terrain with landslide potential. Small slides mapped from 1983-84 event
		5.5	6.19	Wasatch Plat.	C	**FS**	3	3	1,223	L	3,482	L	0	H	H	H	L	G	L	X	HV	LR	**1**	

Road Number	Name	BMP	EMP	Geographic Unit	Functional Class	Jurisdiction	Operational Mntc Level	Objective Mntc Level	Annual Mntc Cost/Mile	Annual Mntc Cost Rating[1]	Deferred Mntc Cost/Mile	Deferred Mntc Cost Rating[2]	Capital Improvement Costs	Recreation Use Value[3]	Resouce Mgmt Value[4]	Watershed Risk[5]	Wildlife Risk[6]	Wet Travel Factor[7]	Engineering Concerns[8]	Potential PFSR	Value Rating	Risk Rating	Road Mgmt Category	Comments
50290	BEAVER CREEK	0	6.69	Wasatch Plat.	L	FS	2	2	805	L	457	L	0	L	M	M	L	P	H		LV	HR	3	EC - Access to this road is by 50025 which crosses landslide terrain. The road also crosses
50340	WOODENSHOE POINT	0	0.88	Monticello	L	FS	2	3	539	L	2,554	L	0	H	M	L	M	P	L		HV	LR	1	EC - low for section defined in this table. Beyond mp .88, however, steep side slopes ocurrabove Woodenshoe Canyon. Erosion areas 1/4 mile below road.
50371	PARADOX	0	2.65	Moab	C	C																		
		2.65	5.08	Moab	C	FS	3	4	2,462	L	2,349	L	0	H	H	M	L	G	M	X	HV	LR	1	
		5.08	10.05	Moab	C	FS	2	4	2,462	L	2,349	L	244,044	H	H	M	L	G	L	X	HV	LR	1	
		10.05	10.7	Moab	C	FS	3	4	2,462	L	2,349	L	31,917	H	H	M	L	P	L	X	HV	LR	1	
		10.7	11.17	Moab	C	FS	2	4	2,462	L	2,349	L	23,079	H	H	M	L	P	L	X	HV	LR	1	
50378	PARADOX VALLEY	0	7	Moab	C	C																		
		7	8	Moab	L	FS	2	3	4,340	L	10,700	L	87,360	M	H	M	L	G	L	X	HV	LR	1	
		8	12.23	Moab	L	FS	2	2	4,340	L	10,700	L	87,360	M	H	M	L	G	L	X	HV	LR	1	
51017	ELECT. SITE ACCESS	0	0.5	San Pitch	L	C																		
		0.5	1.3	San Pitch	L	P																		
		1.3	5.41	San Pitch	L	FS	2	2	752	L	1,231	L	0	L	H	L	L	P	H		HV	LR	1	EC - Jeep trail that crosses steep terrain to access radio facilities. Road crosses eroded areas and
54622	WILLOW BASIN	0	0.7	Moab	L	FS	3	3	3,648	L	3,778	L	0	M	H	L	L	G	L		HV	LR	1	
		0.7	1.2	Moab	L	P	3	3	3,648	L	3,778	L	0	M	H	L	L	G	L		HV	LR	1	
		1.2	1.5	Moab	L	FS	3	3	3,648	L	3,778	L	0	M	H	L	L	G	L		HV	LR	1	
		1.5	1.6	Moab	L	P	3	3	3,648	L	3,778	L	0	M	H	L	L	G	L		HV	LR	1	
		1.6	2.85	Moab	L	FS	3	3	3,648	L	3,778	L	0	M	H	L	L	G	L		HV	LR	1	
54825	BALD MESA ELEC. USERS	0	3.553	Moab	L	FS	2	3	1,238	L	4,114	L	0	L	H	L	L	P	L		HV	LR	1	
55154	DUCK LAKE - REDD PASTURE	0	0.86	Monticello	L	FS	2	3	632	L	2,987	L	0	H	L	L	M	P	L		HV	LR	1	
FH45	SR264 - ECCLES	0	15.57	Wasatch Plat.	A	S																		
FH46	LASAL LOOP	0	20.28	Moab	C	C																		
FH49	FH 49 - LOOP/HARTS DRAW	0	17.59	Monticello	C	C																		
FH7	FAIRVIEW - HUNTINGTON	0	48	Wasatch Plat.	A	S																		
FH8	EPHRAIM - ORANGEVILLE	0	46.6	Wasatch Plat.	A	C																		

1. Annual Maintenance Cost: H>$10,000/mile; M=$5,000 to $10,000/mile; L<$5,000/mile

2. Deferred Maintenance Cost: H>$50,000/mile; M=$25,000 to $50,000/mile; L<$25,000/mile

3. Recreation Use Value is determined by assessing current uses occurring from along the route: High indicates high use levels, major through roads, and points of interest; Medium indicates medium use levels, destination roads, and numerous dispersed campsites; Low indicates a minor through road, no point of interest.

4. Resource Mgmt Value Criteria : H = a road 10 miles or more in length or a functional class of arterial or collector; M = a road 1 to 9.9 miles in length; L = a road less than 1 mile in length. These values were then adjusted up or down depending on access to private land, suitable timber base, minerals exploration and extraction, administration facilities, water facilities, and electronics sites.

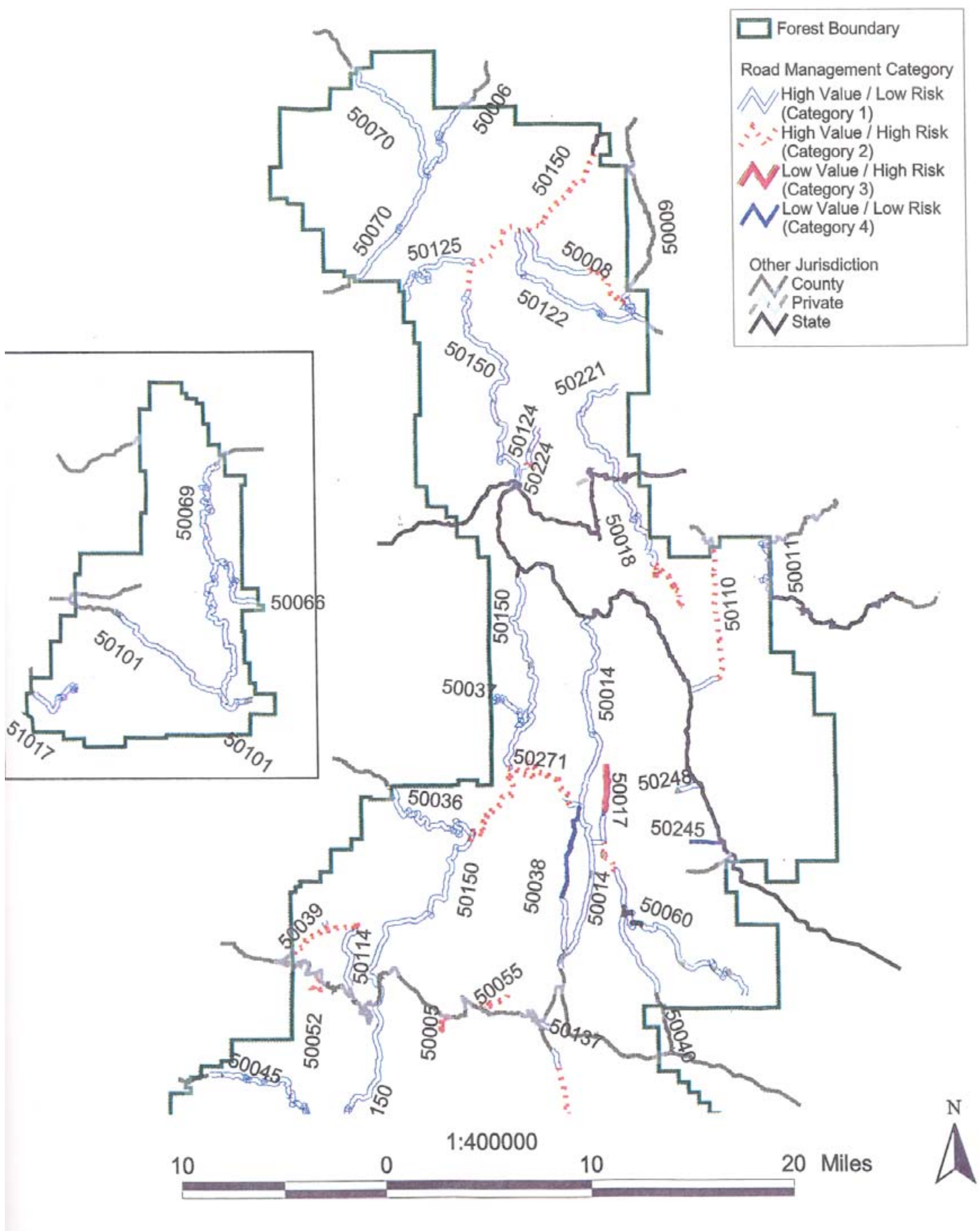
5. Watershed Risk includes all factors which would indicate a degrading watershed condition such as: Sensitive Soils, Riparian Concerns, and Landslide Potential.

6. Wildlife Risk: H = Serious risk to T&E species; M = Moderate risk to T&E species; L= Low risk to T&E species

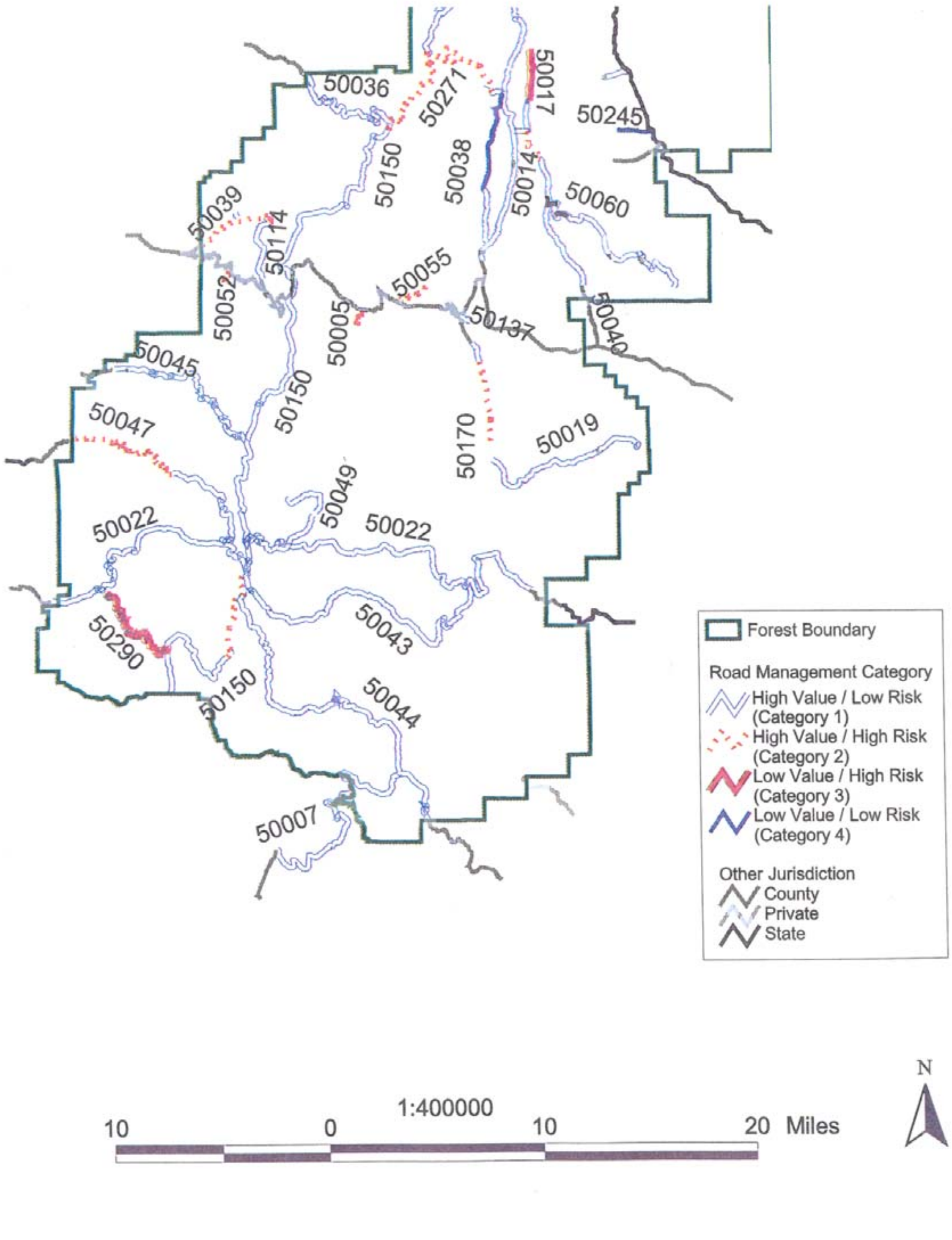
7. Wet travel factor: Dependent upon surface type: P=Poor - Native surface; F=Fair – Improved native surface; G=Good - Aggregate or paved surface

8. Engineering Concerns: L=Low; M=Moderate; H = High. Engineering concern considers such factors as geology, soils, and slope that provide the potential for mass failures and excessive erosion. Redundant alignments are also considered.

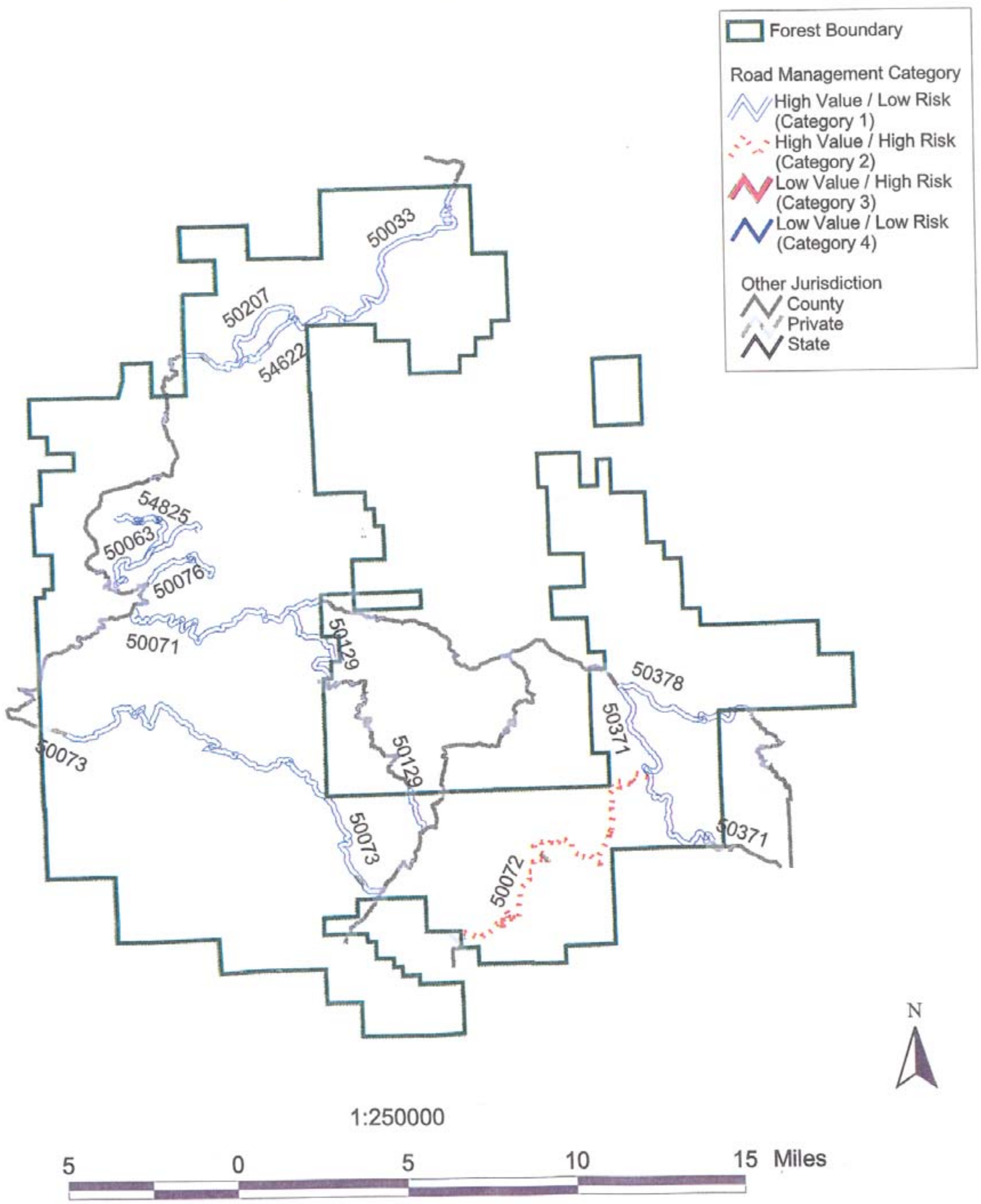
MLNF Forest Scale Roads Analysis
Road Management Categories
San Pitch & Manti Division (North)



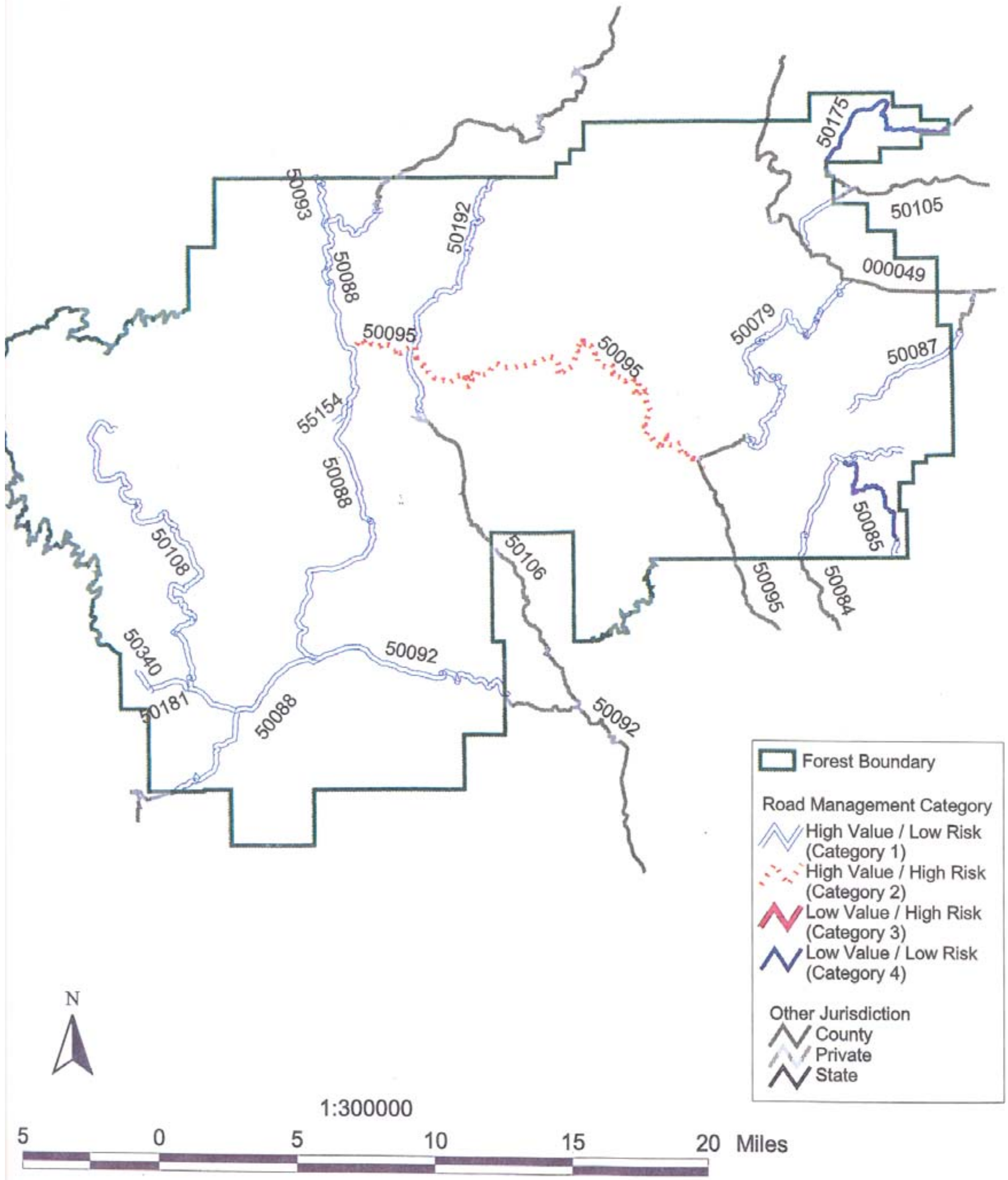
MLNF Forest Scale Roads Analysis
Road Management Categories
Manti Division (South)



MLNF Forest Scale Roads Analysis
Road Management Categories
Moab District



MLNF Forest Scale Roads Analysis
Road Management Categories
Monticello District

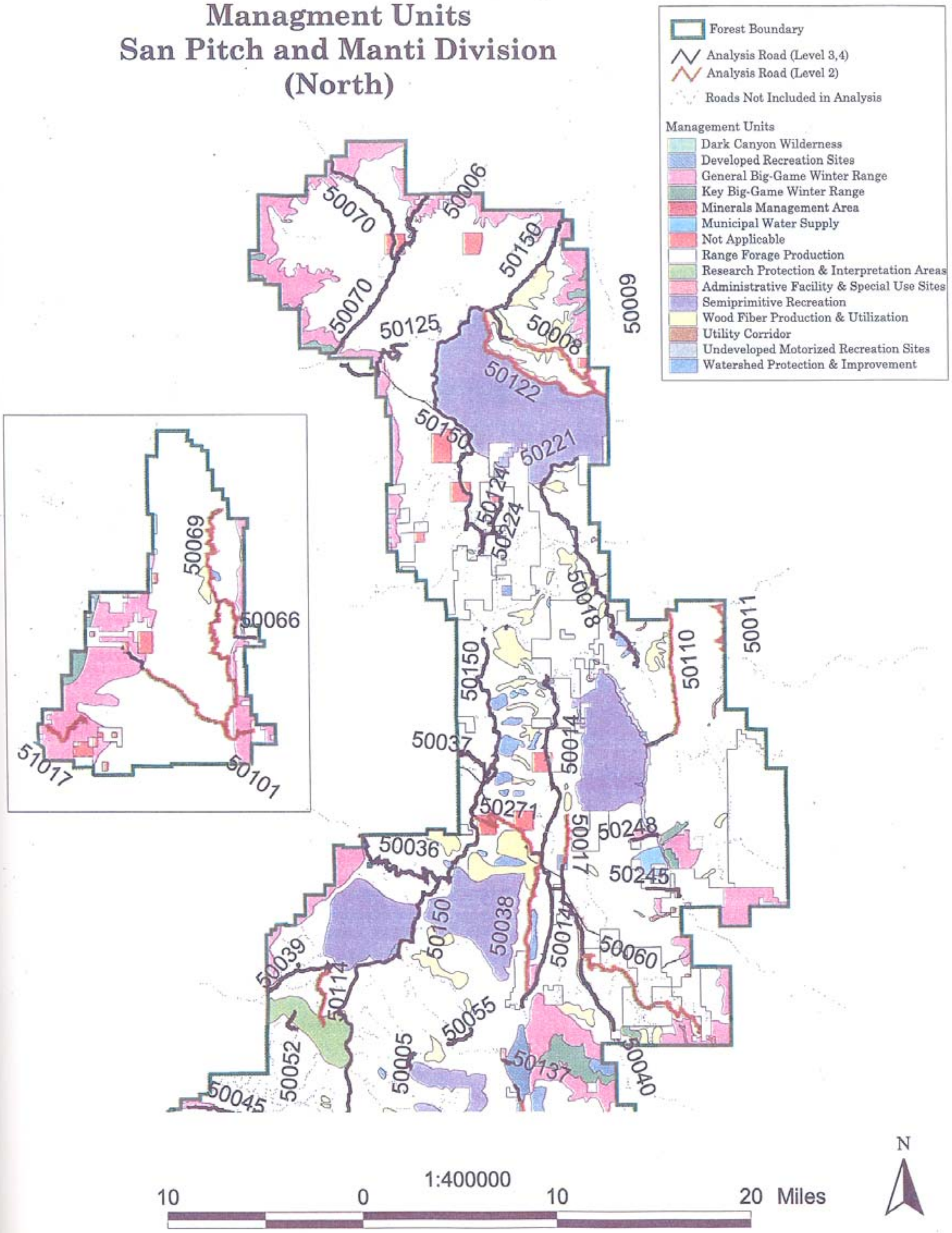


Appendix C

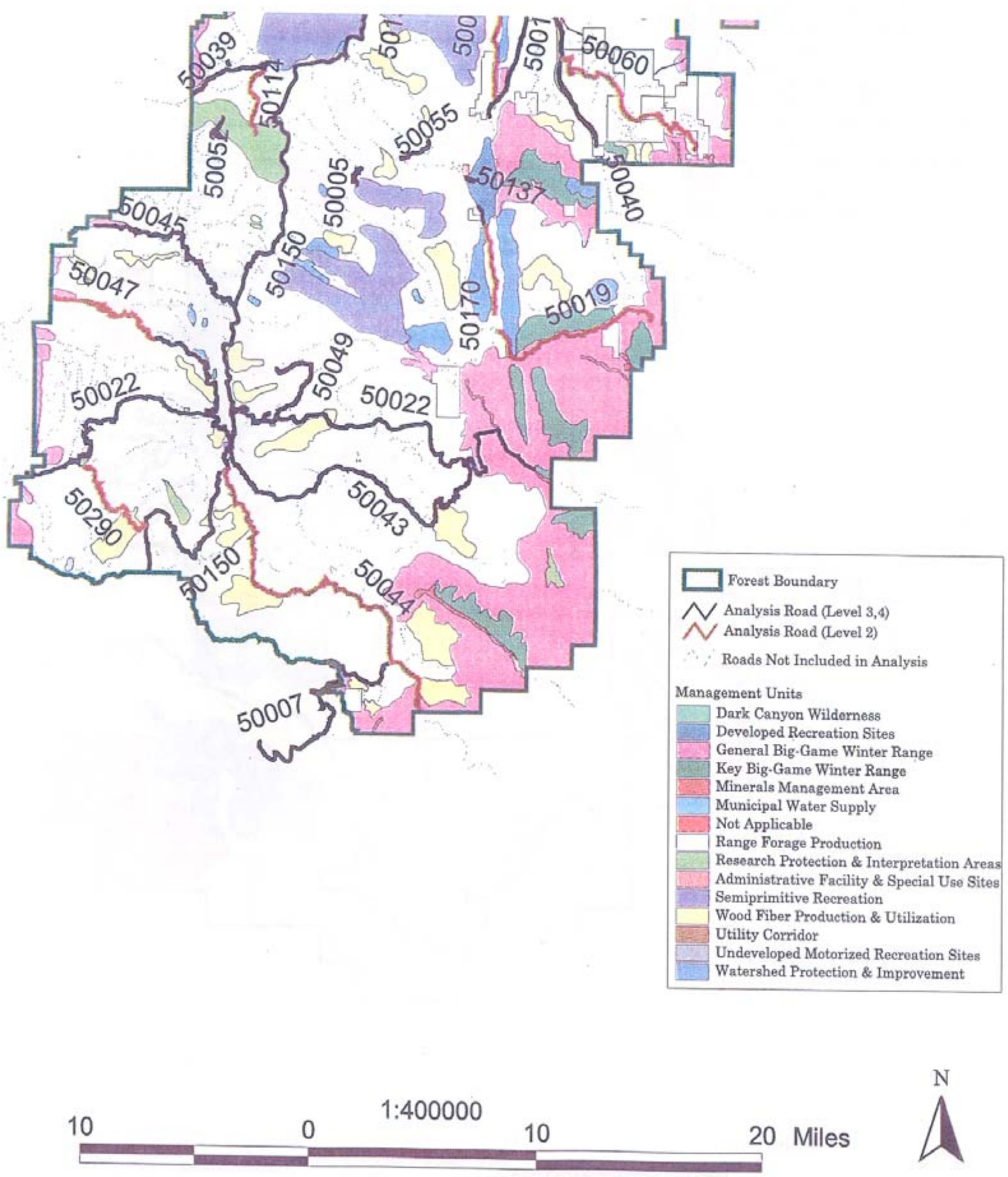
PrimaryTransportation System Maps

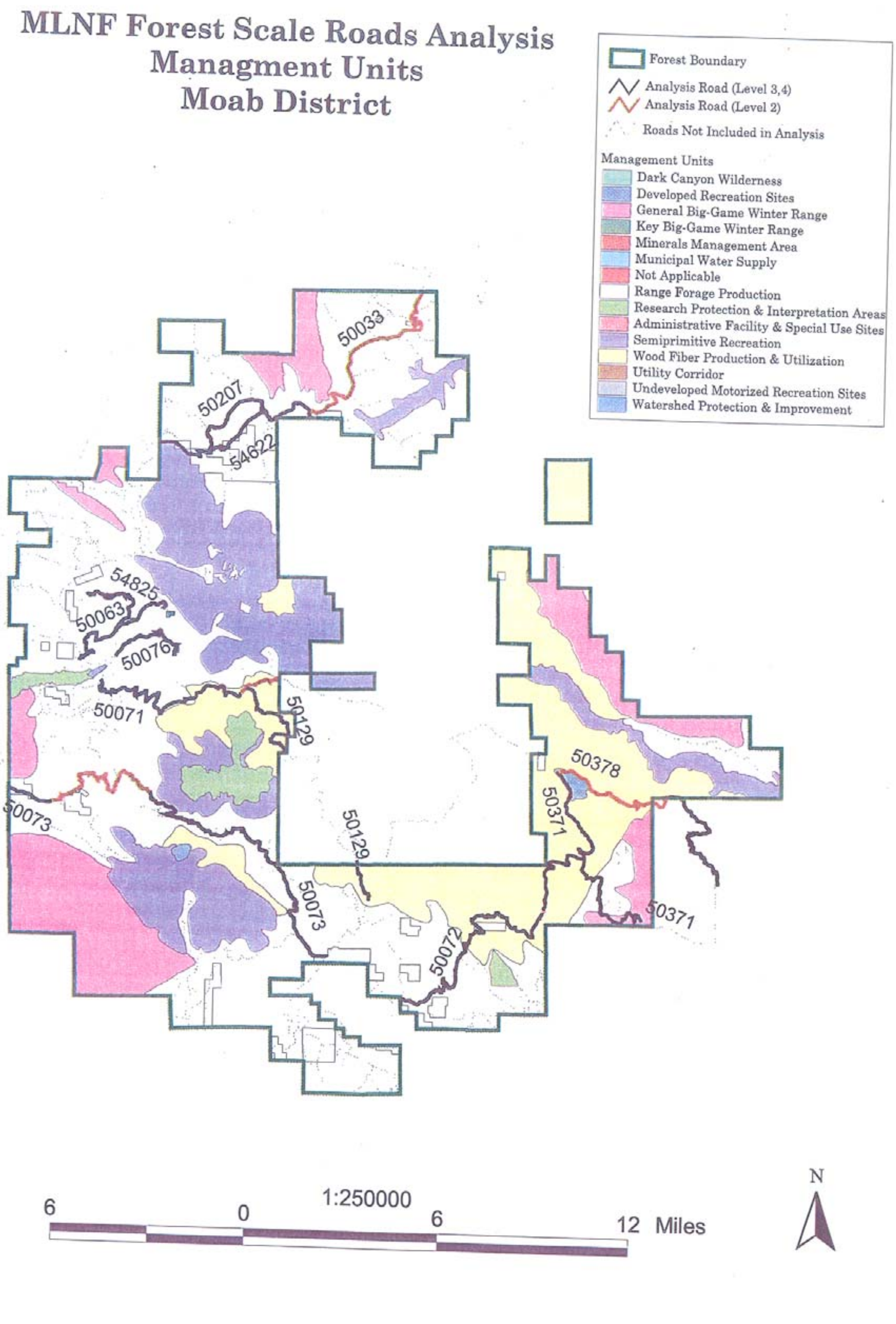
Large maps are available for review
at the Forest Supervisor's Office and all Ranger District Offices.

MLNF Forest Scale Roads Analysis
Managment Units
San Pitch and Manti Division
(North)

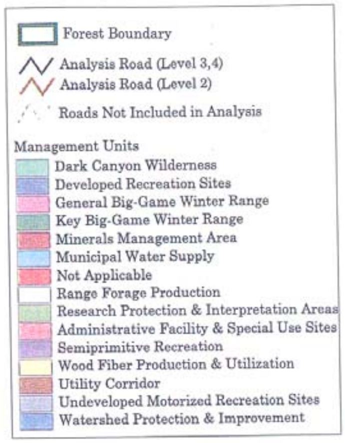


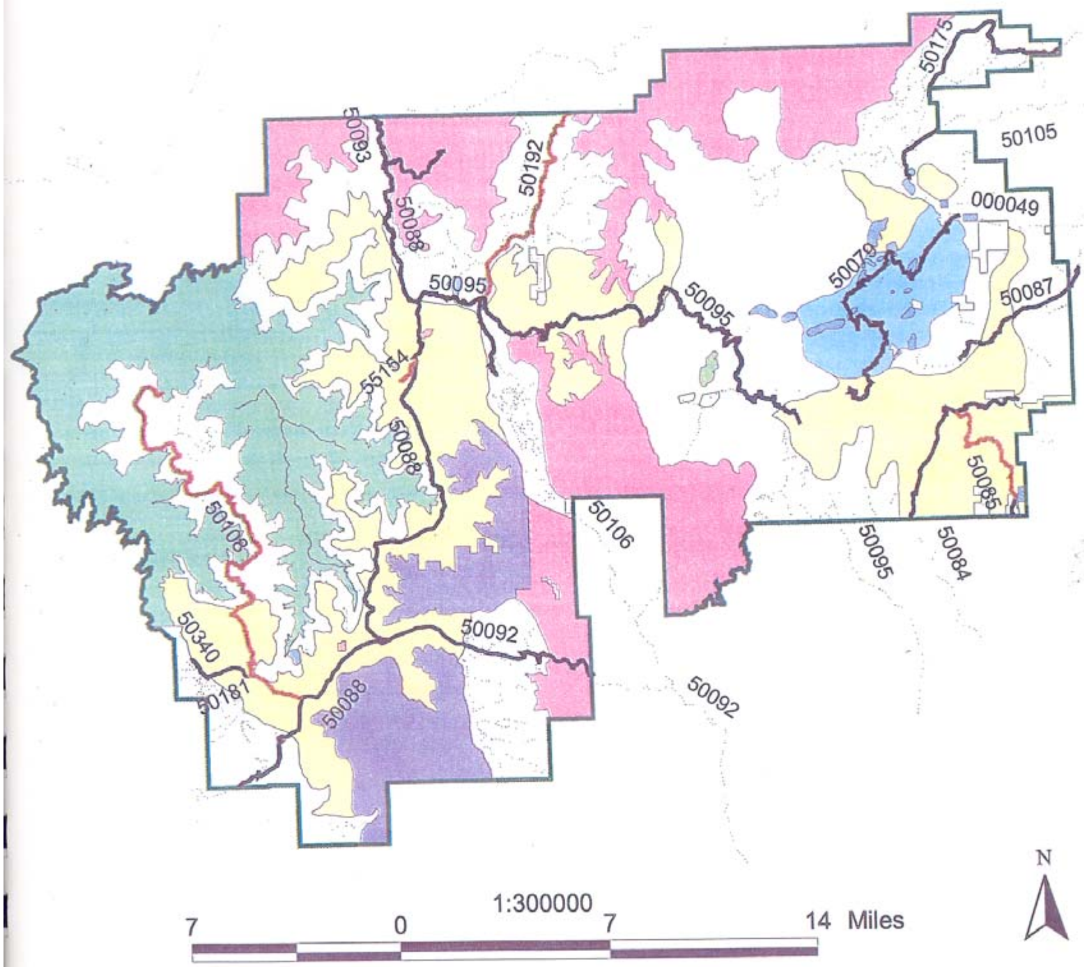
MLNF Forest Scale Roads Analysis
Managment Units
Manti Division (South)



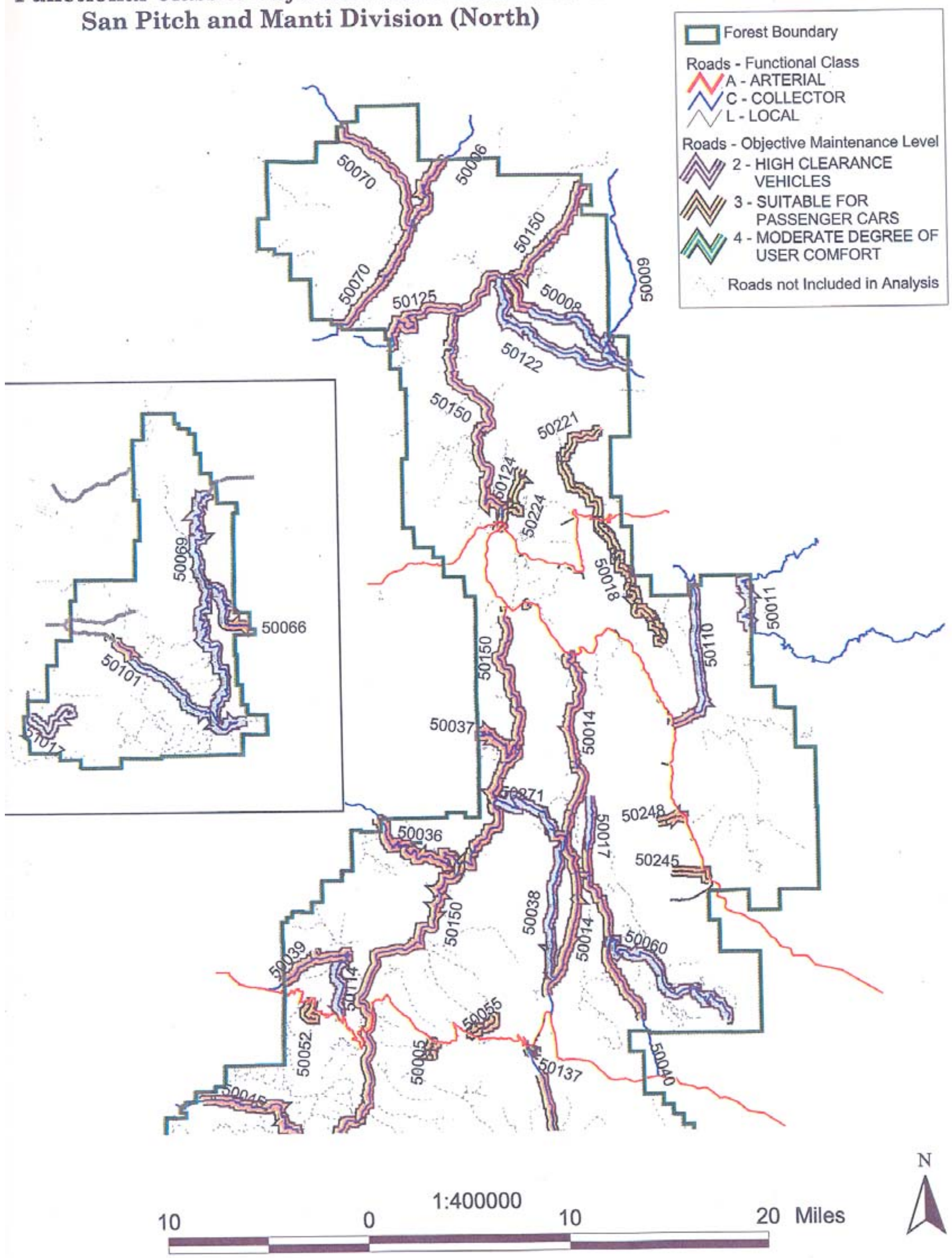

MLNF Forest Scale Roads Analysis
Managment Units
Moab District
Forest Boundary
Analysis Road (Level 3,4)
Analysis Road (Level 2)
Roads Not Included in Analysis
Management Units
Dark Canyon Wilderness
Developed Recreation Sites
General Big-Game Winter Range
Key Big-Game Winter Range
Minerals Management Area
Municipal Water Supply
Not Applicable
Range Forage Production
Research Protection & Interpretation Areas
Administrative Facility & Special Use Sites
Semiprimitive Recreation
Wood Fiber Production & Utilization
Utility Corridor
Undeveloped Motorized Recreation Sites
Watershed Protection & Improvement
50033
50207
54622
54825
50063
50076
50071
50129
50073
50378
50371
50072
1:250000
6
0
6
12 Miles
N

MLNF Forest Scale Roads Analysis
Managment Units
Monticello District

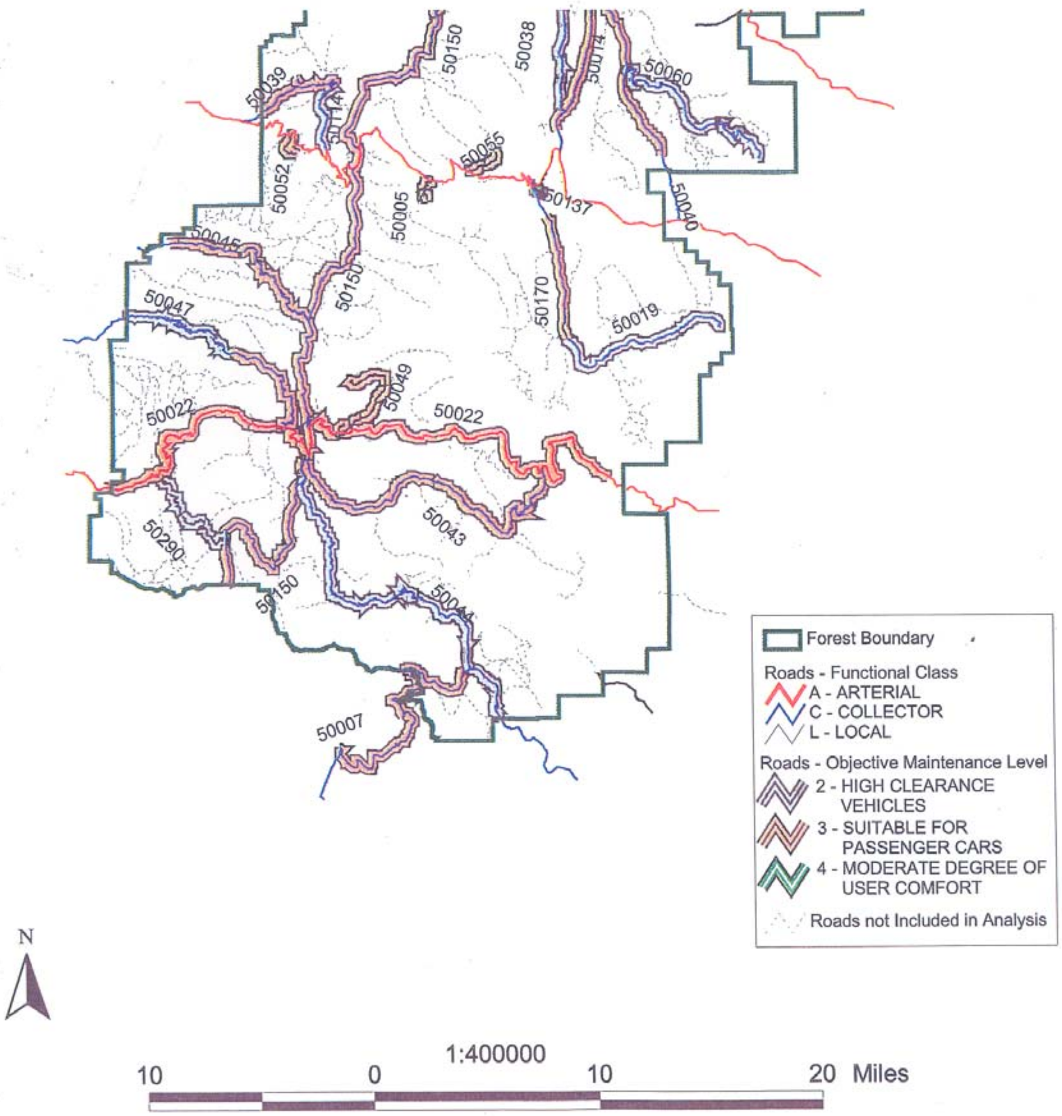




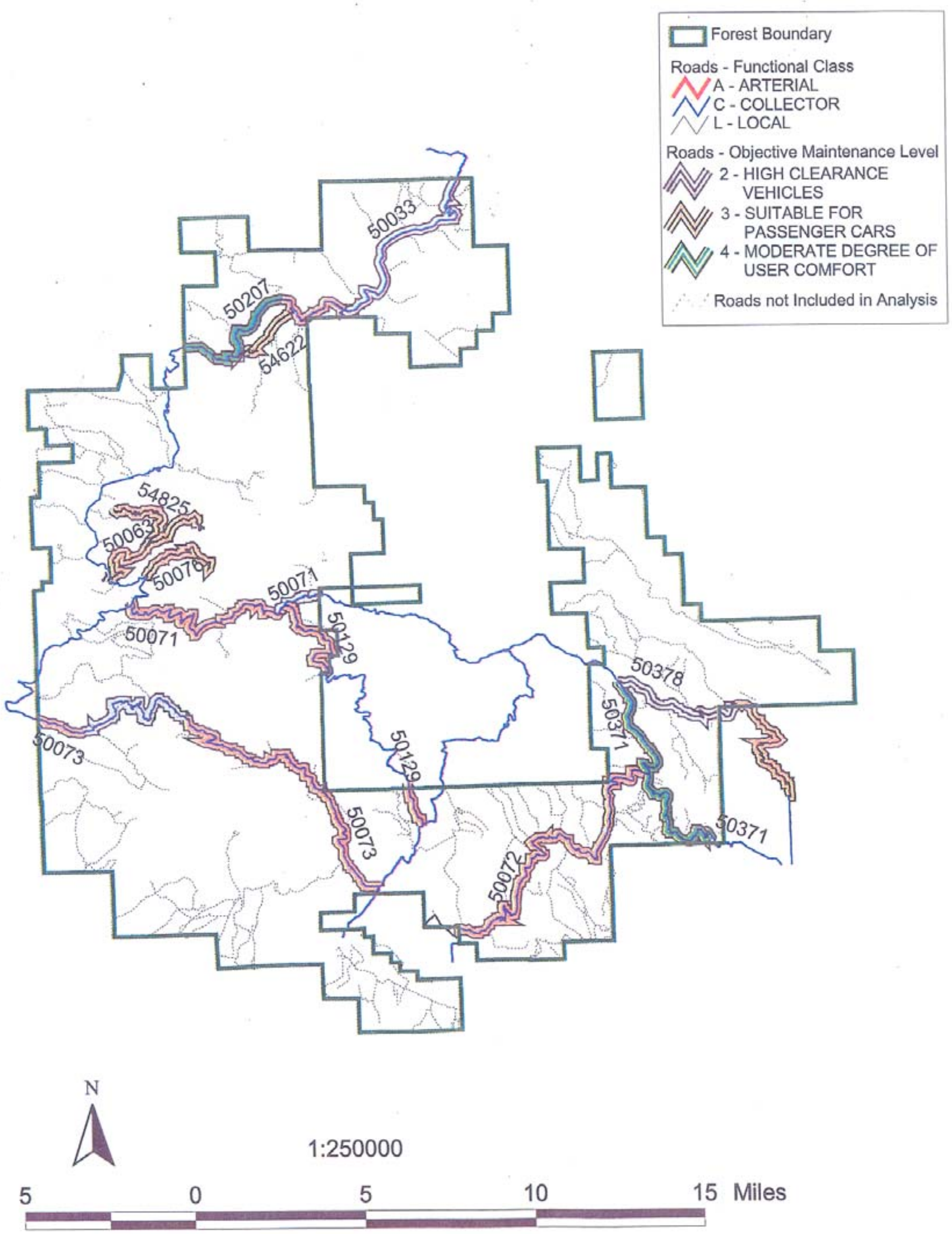
MLNF Forest Scale Roads Analysis
Functional Class & Objective Maintenance Level
San Pitch and Manti Division (North)



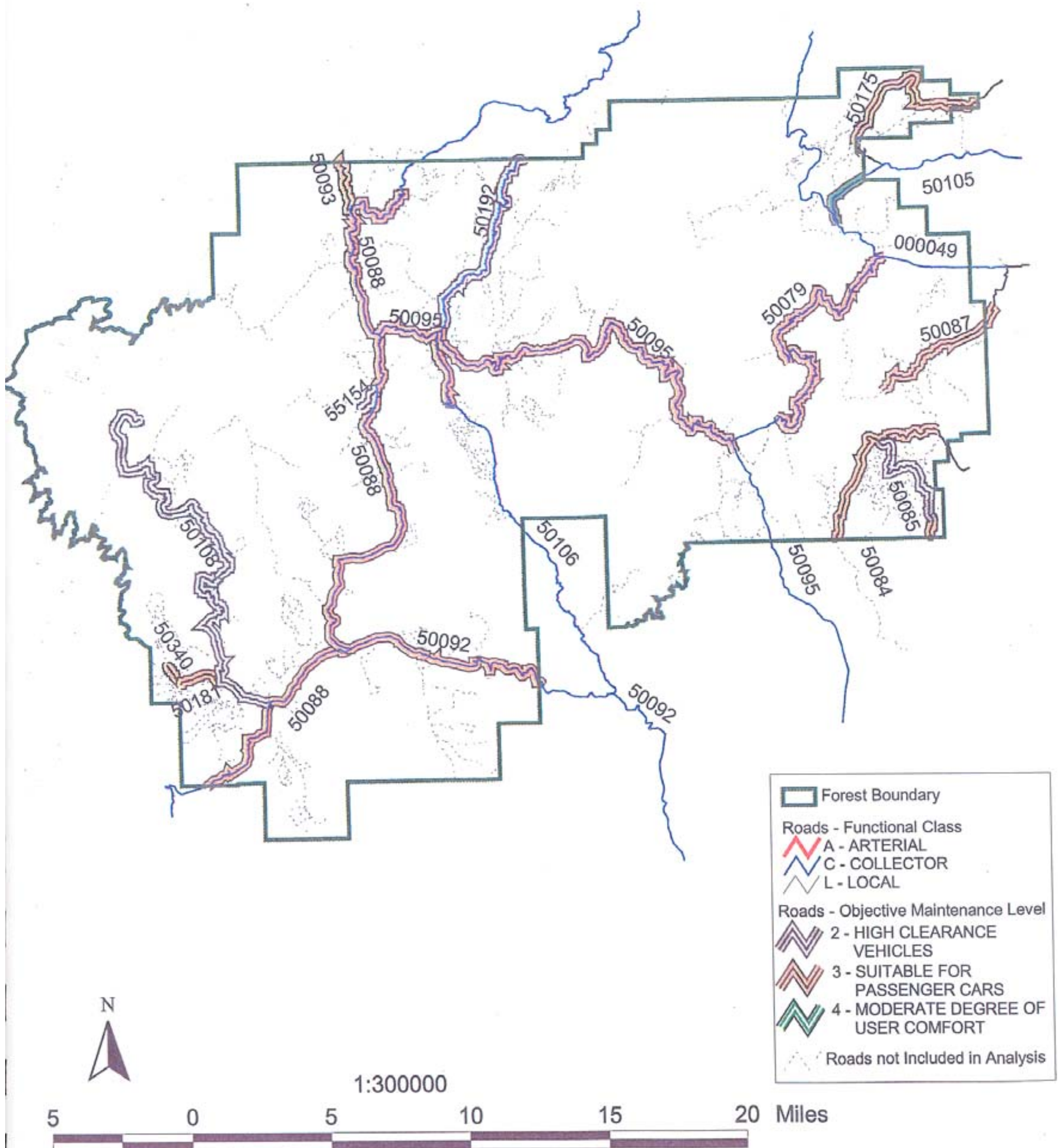
MLNF Forest Scale Roads Analysis
Functional Class & Objective Maintenance Level
San Pitch and Manti Division (South)



MLNF Forest Scale Roads Analysis
Functional Class & Objective Maintenance Level
Moab District



MLNF Forest Scale Roads Analysis
Functional Class & Objective Maintenance Level
Monticello District



Appendix D

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USDA Forest Service, various publication dates (1995-2000), 7.5 Minute DOQ (1 meter resolution): Geospatial Service and Technology Center, USDA Forest Service, Salt Lake City, UT, (quads covering the Manti-La Sal National Forest)

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Appendix E

Glossary

all terrain vehicle (ATV) - Motorized, off-highway vehicle 50 inches or less in width, having a dry weight of 600 pounds or less that travel on 3 or more low-pressure tires with a seat designated to be straddled by the operator. Low-pressure tires are 6 inches or more in width and designated for use on wheel rim diameters of 12 inches or less, utilizing an operating pressure of ten pounds per square inch (psi) or less as recommended by the vehicle manufacturer.

annual road maintenance – Road maintenance that takes place on a recurring schedule and includes any expenditure relating to the upkeep of a road necessary to retain the road's approved traffic service level.

arterial road - A forest road that provides service to large land areas and usually connects with other arterial roads or public highways (FSH 7709.54 – Forest Transportation Terminology Handbook, no longer in print).

classified road - Roads wholly or partially within or adjacent to National Forest System lands that are determined to be needed for long-term motor vehicle access, including state roads, county roads, privately owned roads, National Forest System roads, and other roads authorized by the Forest Service (36 CFS 212.1).

collector road - A forest road that serves smaller land areas than an arterial road. Usually connects forest arterial roads to local forest roads or terminal. (FSH 7709.54 – Forest Transportation Terminology Handbook, no longer in print)

culvert - A conduit or passageway under a road, trail, or other obstruction. A culvert differs from a bridge in that it is usually constructed entirely below the elevation of the travel way. (EM772-100R and EM 7720-100LL section 102).

deferred maintenance - Maintenance activities that can be delayed without critical loss of facility serviceability until the work can be economically or efficiently performed.

fire management area (FMA) - A sub-geographic area within a FMU that represents a pre-defined ultimate acceptable management area for a fire managed for resource benefits. This pre-defined area can constitute a Maximum Manageable Area (MMA) and is useful for those units having light fuel types conducive to very rapid fire spread rates. Pre-definition of these areas removes the time lag in defining a MMA after ignition. It permits pre-planning of the fire area, identification of threats to life, property, and resources, and establishes boundaries and identification of initial actions.

fire management unit (FMU) - Any land management area definable by objectives, topographic features, access, values to be protected, political boundaries, fuel types, or major fire regimes that sets it apart from management characteristics of an adjacent unit. FMUs are delineated in Fire Management Plans (FMP). These units may have dominant management objectives and pre-selected strategies assigned to accomplish these objectives.

forest highway - A forest road under the jurisdiction of, and maintained by, a public authority and open to public travel (USC: Title 23, Section 101(a)).

forest road - As defined in Title 23, Section 101 of the United States Code (23 U.S.C. 101), any road wholly or partly within, or adjacent to, and serving the National Forest System and which is necessary for the protection, administration, and utilization of the National Forest System and the use and development of its resources.

forest scale – See scale.

forest service road - A forest road under the jurisdiction of the Forest Service. The term “Forest Service roads” is synonymous with the term “forest development roads” as used in 23 U.S.C. 205.

forest transportation system - Those facilities, including Forest Service roads, bridges, culverts, trails, parking lots, log transfer facilities, road safety and other appurtenances, and airfields, in the transportation network and under Forest Service jurisdiction.

inventoried roadless area - Those areas identified in a set of inventoried roadless area maps contained in Forest Service Roadless Area Conservation Final Environmental Impact Statement, Volume 2, dated November, 2000, which are held at the National Headquarters of the Forest Service, or any update, correction, or revision of those maps.

local road - A forest road that connects terminal facilities with forest collector, forest arterial or public highways. Usually forest local roads are single purpose transportation facilities (FSH 7709.54 – Forest Transportation Terminology Handbook, no longer in print).

maintenance level - Defines the level of service provided by, and maintenance required for, a specific road, consistent with road management objectives and maintenance criteria (FSH 7709.58, Sec 12.3-Transportation System Maintenance Handbook).

> **maintenance level 1 -** Assigned to intermittent service roads during the time they are closed to vehicular traffic. The closure period must exceed one year. Basic custodial maintenance is performed to keep damage to adjacent resources to an acceptable level and perpetuate the road to facilitate future management activities. Emphasis is normally given to maintaining drainage facilities and runoff patterns. Planned road deterioration may occur at this level. Appropriate traffic management strategies are "prohibit" and "eliminate." Roads receiving level 1 maintenance may be of any type, class or construction standard, and may be managed at any other maintenance level during the time they are open for traffic. However, while being maintained at level 1, they are closed to vehicular traffic, but may be open and suitable for non-motorized uses (FSH 7709.58).
>
> **maintenance level 2 -** Assigned to roads open for use by high clearance vehicles. Passenger car traffic is not a consideration. Traffic is normally minor, usually consisting of one or a combination of administrative, permitted, dispersed recreation, or other specialized uses. Log haul may occur at this level. Appropriate traffic management strategies are either 1) discourage or prohibit passenger cars or 2) accept or discourage high clearance vehicles.
>
> **maintenance level 3 -** Assigned to roads open and maintained for travel by a prudent driver in a standard passenger car. User comfort and convenience are not considered priorities. Roads in this maintenance level are typically low speed, single lane with turnouts and spot surfacing. Some roads may be fully surfaced with either native or processed materials. Appropriate traffic management strategies are either “encourage” or “accept”. “Discourage” or “prohibit” strategies may be employed for certain classes of vehicles or users.
>
> **maintenance level 4 -** Assigned to roads that provide a moderate degree of user comfort and convenience at moderate travel speeds. Most roads are double lane and aggregate surfaced. However, some roads may be single lane. Some roads may be paved and/or dust abated. The most appropriate traffic management strategy is “encourage”. However, the “prohibit” strategy may apply to specific classes of vehicles or users at certain times.
>
> **maintenance level 5 -** Assigned to roads that provide a high degree of user comfort and convenience. Normally, roads are double-lane, paved facilities. Some may be aggregate surfaced and dust abated. The appropriate traffic management strategy is “encourage”.

new road construction - Activity that results in the addition of forest classified or temporary road miles (36 CFR 212.1)

noxious weeds - Those plants designated as noxious weeds by the Secretary of Agriculture or by a responsible State official. Noxious weeds generally posses one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof.

objective maintenance level – The maintenance level to be assigned at a future date considering future road management objectives, traffic needs, budget constraints, and environmental concerns.

primary transportation system - This system is objective maintenance level (ObML) 3 and 4 roads (those maintained for low clearance vehicle use) greater than 0.5 miles in length and ObML 2 collectors.

road - A motor vehicle travelway over 50 inches wide, unless designated and managed as a trail. A road may be classified, unclassified, or temporary.

road construction - Activity that results in the addition of forest classified or temporary road miles.

road decommissioning - Activities that result in the stabilization and restoration of unneeded roads to a more natural state (36 CFS 212.1), (FSM 7703)

road improvement - Activity that results in an increase of an existing road's traffic service level, expands its capacity, or changes its original design function.

road reconstruction - Activity that results in improvement or realignment of an existing classified road.

road risk – A relative (e.g., low, medium, and high) estimate of the likelihood that an event would lead to circumstances that adversely affect important resource values. The risks estimated are those associated with the inherent ecosystem disturbance processes, such as ongoing management practices (road maintenance).

roadless areas - Undeveloped areas typically exceeding 5,000 acres that meet the minimum criteria for wilderness consideration under the Wilderness Act and the planning regulations at 36 CFR 219.17 that were inventoried during the Forest Service's formal Roadless Area Review and Evaluation (RARE II) process, and that remain roadless through forest planning decisions. Designated roadless areas do not overlap with roadless areas.

roads subject to the Highway Safety Act - National Forest System roads open to use by the public for standard passenger cars. This includes roads with access restricted on a seasonal basis and roads closed during extreme weather conditions or for emergencies, but which are otherwise open for general public use.

RS2477 – A law enacted by congress in 1866 that granted right-of-way for the construction of highways across public land not reserved for public uses. Congress repealed RS 2477 in the FLPMA (Federal Land Policy and Management Act) but did not terminate valid rights-of-way existing at the time of enactment. Controversies still arise about whether a public highway was actually established under this statute, and if so, the extent of rights-of-way obtained under the grant.

scale – In this document, the level of resolution under consideration, for example forest-scale (forest-wide) or subforest scale (watershed or site specific project).

scenic backway – These roads generally do not meet secondary highway standards, meaning they are not wide enough, or graded enough, or level enough for passenger cars. However, they do meet the highest standard of scenic, recreational, and historical criteria.

scenic byway - Major roads that are regularly traveled. Some welcome visitors with information centers, interpretive brochures, and signage. Some offer simply a stretch of undisturbed views.

subforest scale – See scale.

temporary road - Roads authorized by contract, permit, lease, other written authorization, or emergency operation, not intended to be a part of the forest transportation system and not necessary for long-term resource management (36 CFS 212.1).

unclassified road - Roads on National Forest System lands that are not managed as part of the forest transportation system, such as unplanned roads, abandoned travelways, and off-road vehicle tracks that have not been designated and managed as a trail; and those roads that were once under permit or other authorization and were not decommissioned upon termination of the authorization (36 CFR 212.1).

unroaded area - Any area without a classified road that is at least 50 inches wide and was constructed or is maintained for vehicle use. The size of the area must be sufficient and in a manageable configuration to protect the inherent values associated with the unroaded condition. Unroaded areas do not overlap with designated roadless areas.

user-created roads and trails – Unclassified roads and trails on National Forest System lands that were initially developed by forest users traveling off of the designated road and trail system. The roads and trails have not been improved and remain in existence through repeated use.

wet travel factor - Most of the native soils on the Forest are high in silt and/or clay content making the majority of native surfaced roads extremely slick under wet conditions. The wet travel factor was established based on existing surface type. Roads with a native surface were given a poor rating, roads with select native surfacing were given a fair rating, and roads with aggregate surfacing or pavement were given a good rating.